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ABSTRACT

Stage Two of the Title IV Quality Control Study evaluated quality in the Department of Education's major student financial assistance programs, by identifying, measuring, and analyzing the causes of inaccurate awarding of student aid funds. This volume recommends and evaluates four major levels of corrective actions to reduce error: (1) reducing the rate and magnitude of the most significant student and institutional item errors, through such actions as using Federal income tax forms to verify certain values on student applications, and changing the definition of household size to be equal to number of Federal income tax exemptions; (2) using base year, as opposed to prospective, income data and redefining dependency status; (3) changing the focus or level of Federal oversight activities, through institution-based quality control and post hoc application data item validation by institutions; and (4) making long-term, structural improvements in the delivery of student aid via such approaches as reducing the number and complexity of application data items. Appendices provide income tables, formula tables, and a report on need analysis reform by the Need Analysis Standards Committee of the National Association of Student Financial Aid Administrators. (JDD)

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U.S. DEPARTMENT OF EDUCATION

TITLE IV QUALITY CONTROL PROJECT

CONTRACT NO: 300-84-0020

STAGE TWO
FINAL REPORT
VOLUME 2
CORRECTIVE ACTIONS

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TITLE IV QUALITY CONTROL STUDY

STAGE TWO

FINAL REPORT
VOLUME II
CORRECTIVE ACTIONS

Submitted to

Division of Quality Assurance
Debt Collection and Management Assistance Service
Department of Education

JULY 1987

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SUMMARY

The Title IV Quality Control Study represents the first comprehensive evaluation of quality in the Department of Education's (ED's) major student financial assistance programs. The purpose of the study is to identify, measure, and analyze the causes of inaccurate awarding (i.e., error) of student aid funds. Earlier studies were predominantly aimed at error in the Pell Grant program. This study examines error in the Pell Grant, Campus-Based, and Guaranteed Student Loan (GSL) programs.

Volume 1 of the Final Report for this study is entitled Findings. Data and analyses presented in that volume suggest that while corrective actions aimed at reducing the magnitude of error have had some success, there is still an unacceptably high level of error in each of the Title IV programs. The delivery mechanisms for student financial aid are highly error prone. While short-term corrective actions will help reduce specific pockets of error, changes to the structure of the delivery process are required to make major breakthroughs.

In this volume, analyses conducted to recommend and evaluate corrective actions to reduce error are presented. There are four major levels of corrective actions analyzed in this volume. The first level is potential means for reducing the rate and magnitude of the most significant student and institutional item errors. The analysis of this first level is found in Chapter 2. Short-term corrective actions relating to the first level include:

- The use of the Federal tax form as a tool for identifying the erroneous reporting of certain zero values on a student's application for financial assistance. The tax return can indicate the likely necessity for non-zero values for such items as home equity, savings, assets, and certain non-taxable income.

- Reduction in household size error through either changing the definition of household size to be equal to number of exemptions, requiring a completed Verification Worksheet for each applicant with a section relating to household size, or using number of exemptions versus household size as a verification edit.

- Reduction in number in college error through either verifying all applicants who report more than one in postsecondary education or requiring a completed Verification Worksheet with a section relating to number in college.

- Improvement in the forms and instructions for other non-taxable income, household size, and number in college.

- Clarification and/or alteration of definitions and procedures relating to the enrollment status of clock hour, non-standard enrollment, and summer term students.

- Broader use of institution-based quality control activities aimed at the identification and eradication of the disproportionate concentration of procedural and calculation errors at a small number of schools.

- Improved procedures for calculating Campus-Based and GSL need for those students who do not receive Pell Grants, but may be eligible for them.

- Improved communication by ED with institution presidents and financial aid administrators relating to commonly occurring errors and the need for standardized quality control procedures.

The second level of analysis examines the likely impact of soon to be implemented corrective actions with a slightly broader scope. There are two actions required by the recent reauthorization of the Higher Education Act that are analyzed. These are the use of base year, as opposed to prospective, income data and the redefinition of dependency status.

Analysis of the use of prospective income data and the redefinition of dependency status are found in Chapters 3 and 4 respectively. Key results are:

- In the Campus-Based programs, a shift from prospective to base year income for independent students will result in a downward shift in need. The error rate for this data item will drop to less than half of its current level.
- In the Pell Grant program, fewer than 20 percent of recipients will be affected by the change. Generally, the lower income students would not be affected.
- Expansion of self-sufficiency criteria will greatly reduce the rate at which current dependent students would be classified as independent students under the revised definition.

The third level of analysis pertains to corrective actions that involve a change in the focus or level of Federal oversight activities. In Chapter 5 we examine two such corrective actions, institution-based quality control and post hoc application data item validation by institutions. The major conclusions are:

- Institution-level quality control procedures are associated with lower institutional error. The results support continued expansion of the Institutional Quality Control initiative to additional institutions and the provision of technical assistance relating to quality control procedures to all schools.
- Confirming similar analysis presented in Findings, post hoc validation is successful in removing targeted item errors. We analyzed the association between various procedures for conducting validation and the amount of error removed through validation in an attempt to identify particularly successful techniques. However, no significant differences were found among the various procedures. This indicates that improved targeting of applicants for validation is the remaining tool for increasing the efficiency of validation.

The fourth level of analysis is aimed at corrective actions focusing on long-term, structural improvement in the delivery of student aid. This corrective action focus is the subject of a separate volume entitled Delivery System Quality Improvements. In that volume a multi-phased approach to implementing six quality improvements is presented. These quality improvements represent significant changes in the delivery process and hold out the best hope for removal of the currently high levels of error. One such improvement, is the reduction in the number and complexity of application data items for the Campus-Based programs. Analysis of this possible corrective action is presented in Chapter 6 and indicates very positive outcomes can be achieved by significantly reducing the number of data elements currently required.

The current study is not the first to examine the quality of the Title IV programs. Previous studies have found error to be high in the programs, and they have provided the basis for corrective action recommendations and improvements made in the reauthorization of the Higher Education Act. These recommendations and corrective actions include:

- Including and monitoring quality control requirements in each ED contract involving the delivery of student aid
- Introducing error-prone modeling techniques for the selection of Pell Grant recipients for institutional validation and development of comprehensive edits of application data
- Extending the validation requirements to include the Campus-Based and GSL programs and continued training opportunities for institutional financial aid and fiscal personnel
- Increasing the number of applicants chosen for validation

- Increasing the number of data items to be verified
- Matching application data with other Federal sources of financial information
- Developing management initiatives to expand quality control at the institution level
- Changing how a student's dependency status is determined
- Developing a shortened Pell form for low income families
- Decreasing the use of prospective income in the Pell and Campus-Based programs substantially

The results of analyses of findings and corrective actions indicate that ED faces a critical decision in improving the quality of the Title IV delivery system. Error continues to be high in spite of corrective actions already taken. Yet the corrective actions ED has taken have nearly exhausted the options for using mechanical approaches to reducing error in individual data items. ED must either accept error rates of the magnitude that currently exist, including the reliance on costly after-the-fact inspection techniques, or accept the challenge of restructuring and simplifying the delivery system itself.

Our specific recommendations and findings are summarized in Exhibit 1. However error is defined, broadly to include all regulatory and procedural requirements or narrowly to include only financial liability, it seriously undercuts the basic objectives of equity and fairness. The remainder of this report addresses this issue in detail.

SHORT-TERM (LEVELS I and II)	• To address errors in home equity, savings, assets, and certain non-taxable income items, we recommend using the Federal tax form as a tool for identifying the erroneous reporting of certain zero values on a student's application for financial assistance. • For errors in household size, number in college, and other non-taxable income we recommend improvements to the respective forms and instructions. We also recommend using the Federal tax form to indicate the presence of certain non-taxable items and the number of exemptions claimed to flag possible erroneous household sizes (or even changing the definition of household size to equal number of exemptions). • We recommend clarifying and/or altering definitions and procedures relating to the enrollment status of clock hour, non-standard enrollment, and summer term students. This includes alerting schools to error-prone situations and clarifying allowances for summer sessions. • We recommend broader use of institution-based quality control activities aimed at identifying and eradicating the disproportionate concentration of procedural and calculation errors at a small number of schools. • We recommend improved procedures for calculating Campus-Based and GSL need for those students who do not receive Pell Grants, but may be eligible for them, especially by clarifying the use of Pell eligibility versus Pell award. • We recommend improved communication by ED with institution presidents and financial aid administrators relating to commonly occurring errors and the need for standardized quality control procedures. • We recommend expanding self-sufficiency criteria in the new definition of dependency status to greatly reduce the rate by which current dependent students would be classified as independent students.
LONG-TERM (LEVELS III AND IV)	• Our analyses show that institution-level quality control procedures are associated with lower institutional error. The results support continued expansion of the Institutional Quality Control initiative and providing technical assistance relating to quality control procedures to all schools. • Our analyses show that validation is successful in removing errors in targeted items. We analyzed the association between various procedures for conducting validation and the amount of error removed through validation in an attempt to identify particularly successful techniques. However, no significant differences were found among the various procedures. This leads us to recommend that the best chance for improved results is better selection of error-prone applications for validation. • Our analyses show that reducing the number and complexity of data items in the Uniform Methodology (UM) indicates that error can be reduced in the Campus-Based and GSL programs without significantly affecting the distributions of need and certification. We recommend that ED proceed with the design and implementation of a reduced data element needs analysis formula. • We recommend ED embark on a long-term plan to improve the structure of student aid delivery. Specific recommendations are found in a separate volume, Delivery System Quality Improvements.

EXHIBIT 1. A SUMMARY OF CORRECTIVE ACTION RECOMMENDATIONS AND ANALYSES

1.0

INTRODUCTION

The ultimate purpose of the Department of Education's (ED's) quality control studies is to reduce error and improve the quality of the Title IV programs.[1] Thus, an important component in ED's quality improvement strategy is the analysis and implementation of corrective actions. This document reports on corrective actions based on findings from Stage Two of the Title IV Quality Control project. Two basic types of analyses are presented in this report: those that lead to developing corrective actions, and those that assess (where possible) the likely effects of corrective actions. In this chapter we present highlights from Findings, the framework for identifying and classifying corrective actions, and consequences that the study design places on our ability to develop and assess corrective actions.

1.1 HIGHLIGHTS OF FINDINGS

The Department of Education (ED) has designed a comprehensive quality program for assessing the delivery of student financial aid. This quality program has five far-reaching objectives that affect the direction and focus of its related activities. These objectives are the following:

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[1] For a detailed description of the Title IV programs, please see Appendix A to Findings.

- To develop procedures to define quality in the Title IV programs;
- To identify, measure, and evaluate deviations from quality (the occurrence of error);
- To determine the causes and factors affecting major errors;
- To identify, analyze, and implement corrective actions; and
- To monitor the effects of corrective actions on quality.

As one in a series of quality control studies designed to measure the quality of the student financial aid programs, the current study is part of an ongoing attempt to increase awareness within ED of the consequences of a lack of quality. These quality control studies have included: the Pell Grant Quality Control contract, which measured error in the Pell program for the 1980-81 and 1982-83 academic years; Stage One of the Title IV Quality Control contract, which tested a methodology to measure error in the Campus-Based and GSL programs for the 1983-84 academic year; and the current study -- Stage Two of the Title IV contract, which constitutes the first integrated study to measure error in the Pell, Campus-Based, and GSL programs. The current study measured error in the 1985-86 academic year.

In the previous volume of this study, Findings, we presented our estimates of the extent and type of error in the Title IV programs. In Findings, we presented overall estimates of error for each of the Title IV programs and apportioned the error to students, institutions, and finally to individual student application items and institutional items. In addition, we tested a variety of characteristics of students and institutions to determine if the characteristics were associated with error. This document examines the errors presented in Findings and their source and determines probable causes of the errors. Based on the probable causes, this report will assess alternative corrective actions aimed at these causes. Following are highlights of the analyses presented in Findings.

1.1.1 Error in the Pell Grant Program

Due to the relatively strict rules that govern the Pell Grant program, payment consequences of errors in application or institutional items can be measured accurately. From these calculated payment consequences, Stage Two analyses produced the following findings concerning error in the Pell Grant program:

- About 54 percent of 1985-86 Pell Grant recipients had errors which resulted in changes in award. The frequency of overawards was more than double that of underawards.
- Absolute program-wide payment error (adding overawards to underawards) totalled $763 million or 21 percent of total program funds awarded.
- Net program-wide error (overawards offsetting underawards) totalled $407 million.
- Nearly 32 percent of the recipients had student errors which resulted in $439 million in absolute program-wide payment error.
- Errors in non-taxable income and reported home equity resulted in $75 million and $64 million, respectively, in net payment error. Prospective items as a group, including household size and number in college, contributed about $78 million to Pell student error.
- Thirty percent of the recipients had institutional errors. These errors resulted in $386 million in absolute program error, or 11 percent of program funds. Errors in determining enrollment status were the most frequent institutional errors.

These highlights demonstrate the need to implement corrective actions for errors in the Pell Grant Program.

1.1.2 Error in the Campus-Based Programs

Error measurement in the Campus-Based programs first requires calculating changes to need, a measure of a family's ability to pay for education, which takes into account the cost of education and other financial aid available. This section presents the findings for need error and awards in excess of need. Campus-Based distributional error is not discussed in this report.[2]

- **Need error** (both increases and decreases in need) occurred in 77 percent of cases, with **net need error** (increases offsetting decreases in need) totalling $504 million in need overstatements. **Awards in excess of need** (cases where best need fell below award) were present in 22.5 percent of the cases and totaled $265 million.
- **Student need error** occurred in 65 percent of the cases and totaled $403 million net. **Institutional need error** occurred in 32 percent of the cases and totaled $100 million net.
- Errors in estimating expected income led to the largest need errors for individual items. Errors in expected taxable and non-taxable income each resulted in $114 million in net need error. As a group of items, prospective items resulted in $319 million in net need error.
- Institutional error most often occurred due to errors in factoring Pell awards in Campus-Based need. However, institutional errors in disbursement and initial overawards caused the largest dollar errors, $42.8 million and $47.2 million, respectively, to be awarded in excess of need.

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[2] Campus-Based distributional error translates the effects of need errors to likely changes in awards by using institutional packaging constraints and parameters.

Because these errors demonstrate a significant deviation from quality in the Campus-Based programs, corrective actions are needed to reduce these errors.

1.1.3 Error in the GSL Program

Error in the GSL program is measured at the point of certification of a loan(s) by the institution and is defined as the decrease in certification amount when best values are used, subject to maximum loan limits. (Only overcertifications are considered errors in the GSL program for purposes of this study.) The GSL estimates do not represent costs to the government; costs to the government are estimated by taking into account actual loan amounts and government costs per dollar loaned. Following are highlights of Findings on overcertification in the GSL program.

- Approximately 20 percent of the cases had GSL certification error, totalling $920 million in overcertifications of loans program-wide.
- Student errors causing overcertifications occurred in 10.6 percent of the cases and accounted for $393 million program-wide. Institutional errors were slightly more prevalent in 13.5 percent of the cases, and totaled $587 million program-wide.
- Institutional error was most often attributed to errors in determining EFC. This occurred in 6.2 percent of the cases and accounted for $260 million program-wide, which was also the largest dollar error.

These findings indicate that GSL error was significant and that corrective actions are necessary to reduce the error.

1.1.4 Validation and Institutional Quality Control

In addition to measuring the level of error in each of the Title IV programs, Findings focused on the effectiveness of two key efforts to improve quality in the Title IV programs. We analyzed ED mandated validation in the Pell program and optional institutional validation activities in Pell, Campus-Based, and to a limited degree, GSL. Findings also examined voluntary institutional quality control procedures. The study data concerning validation and institutional quality control procedures indicated the following:

- Validation, mandatory and voluntary, occurred for 80 percent of the Pell Grant recipients.
- Students selected for validation by the Pell Processor had the highest rates of error on their initial applications for the six data items mandated for validation.
- After validation the remaining error in these six items was not much different for Pell selected, institution selected, and non-validated students.
- Despite not targeting well, institutions do a good job of removing potential error through validation for those students with discrepancies.
- After validation error still remains high. Pell selected recipients had $161 error per student, institution selected recipients had $127 error per student, and non-selected students had $207 error per student by the time final awards were made.
- Validation in the Campus-Based programs was virtually as extensive as in Pell, with recipients receiving awards from multiple programs most likely to be validated. Pell validated Campus-Based recipients selected by the Pell processor had the lowest error rates.
- Validation in the GSL program is relatively rare.

- **Pell and Campus-Based recipients attending institutions that used particular types of quality control procedures extensively (e.g., sampling) had a significantly lower institutional error rate.**
- **Recipients attending institutions with little or no quality control procedures had the highest institutional error rates.**

Validation and institutional quality control represent broad strategies for reducing error in the Title IV programs. These findings indicate that corrective actions building on these strategies should be examined.

1.2 CORRECTIVE ACTIONS FRAMEWORK

As part of its cohesive corrective actions strategy, ED has conducted numerous quality control studies of the student financial aid programs. Consistently, these studies have found quality problems to be a major concern for each of the programs. Because error has been pervasive at all levels (item-level as well as system-wide), it is necessary to examine many different levels of corrective actions. Four alternative levels include corrective actions aimed at errors in individual data items or individual components of the delivery systems, corrective actions for groups or classes of similar data items or components of the delivery systems, corrective actions based on changes in strategic approaches to improving quality, and corrective actions aimed at major problems in the programs that involve structural changes in the delivery system.

Previously, each of these types of corrective actions has been determined to have merit. Therefore, the current study and investigation of corrective actions will take the same approach as previous studies and will examine corrective actions at all four levels. These levels are differentiated as follows:

- Level I - corrective actions designed in response to significant errors in individual data items or individual components of the delivery system, often as short-term measures;
- Level II - corrective actions oriented towards groups or classes of data items, or types of components of the delivery system;
- Level III - corrective actions that constitute a shift in the approach to quality; and
- Level IV - corrective actions that are longer-term and involve major, in many cases structural, changes in the delivery systems or the Title IV programs.

Because there exists a range of possible corrective actions for errors or problems in the delivery system, it is necessary to look across all levels for evaluating alternatives. These four levels are distinguished by:

- The time frame or focus to which the corrective actions are oriented (short-term, intermediate-term, or long-term);
- The types of activities or changes required to implement the corrective actions (administrative decisions, regulatory changes, or changes in legislation);
- Changes in the roles of the participants in the delivery system caused by the corrective actions; and
- Whether or not the corrective actions would require the use of new technologies.

Exhibit 1-1 summarizes the alternative levels of corrective actions and how they differ along these four parameters. In addition to summarizing how Level I, II, III, and IV corrective actions differ, Exhibit 1-1 also shows corrective actions that are representative of each of the levels.

These four levels of corrective actions translate naturally into a strategy for improving the quality of the Title IV delivery system. Level I corrective actions will reduce error in the items towards which they are targeted, yet Level I corrective actions are not able to address the majority of error inherent in the delivery system. Much residual error will remain after implementing Level I corrective actions.

Level II corrective actions will affect error in data groups within the delivery system. Because Level II corrective actions affect larger aspects of the delivery system, they will remove more error than Level I corrective actions. However, even after implementing Level II corrective actions, a significant amount of residual error will remain.

Level III corrective actions are oriented towards processes within the delivery system. In particular, Level III corrective actions are targeted on reducing error by restructuring procedures, lines of control, and authority within the delivery system. By implementing Level III corrective actions most residual error will be removed. The remaining residual error after Level III corrective actions will be the portion inherent in the delivery system.

	DIFFERENTIATING CHARACTERISTICS			
LEVEL OF CORRECTIVE ACTION	FOCUS	METHOD REQUIRED FOR IMPLEMENTATION	EXTENT OF CHANGE IN ROLES AMONG PARTICIPANTS	EXTENT OF NEW TECHNOLOGIES REQUIRED
LEVEL I	SHORT-TERM TO INTERMEDIATE-TERM	ADMINISTRATIVE DECISION	NONE	NONE
LEVEL II	INTERMEDIATE-TERM	ADMINISTRATIVE DECISION OR MINOR REGULATORY CHANGE	NONE	• AUTOMATION OF EXISTING INDIVIDUAL PROCESSES
LEVEL III	INTERMEDIATE-TERM TO LONG-TERM	REGULATORY CHANGE OR LEGISLATIVE CHANGE	MAJOR CHANGES LIKELY	• SOFTWARE MODIFICATION • MINOR SOFTWARE OR SYSTEM REDESIGN
LEVEL IV	LONG-TERM	LEGISLATIVE CHANGE	MAJOR CHANGES LIKELY	• SOFTWARE • HARDWARE • MAJOR SYSTEM REDESIGN • DBMS IMPLEMENTATION OR CONVERSION

EXHIBIT 1-1. DIFFERENTIATING CHARACTERISTICS OF ALTERNATIVE LEVELS OF CORRECTIVE ACTIONS

The residual error remaining after Level III corrective actions can only be affected by Level IV corrective actions, which are oriented towards structural aspects of the delivery system. Level IV corrective actions will remove most or all of the error-prone components of the delivery system and will minimize residual error. Exhibit 1-2 summarizes these aspects of the corrective action framework and its implied strategic approach to reducing the residual error in the Title IV delivery system.

These four levels of corrective actions are descriptive of the majority of possible corrective actions. However, these levels do not exhaust the universe of possible combinations of the four differentiating parameters and should not be inferred as the only differentiating characteristics. Therefore, all components for each differentiating characteristic as indicated in Exhibit 1-1 need not be present for all corrective actions at each level. For example, not all Level IV corrective actions will require the types of major technology changes indicated in Exhibit 1-1. However, given the nature of Level IV corrective actions, these types of technology changes are likely.

1.2.1 Level I Corrective Actions

Level I corrective actions may include changes in individual data items or individual components of the delivery system, changes to forms, or changes in timing. Clarifying or modifying the procedures for determining enrollment status is an example of a Level I corrective

CORRECTIVE ACTION LEVEL	*CORRECTIVE ACTION COMPONENTS*	*TARGETS OF IMPLEMENTING CORRECTIVE ACTIONS*
LEVEL I	• INCREASED VERIFICATION OF INDIVIDUAL DATA ITEMS OR INDIVIDUAL PROCEDURES. • IMPROVEMENTS TO FORMS	• REDUCED ERROR IN TARGETED ITEMS • MINIMAL LIKELY EFFECTIVENESS OF CORRECTIVE ACTIONS DUE TO NATURE OF DATA ITEMS AND ERROR. • MUCH RESIDUAL ERROR REMAINS
LEVEL II	• CHANGES IN DEFINITIONS OR TREATMENT OF DATA ITEMS OR PROCEDURES, OR IN GROUPS OF DATA ITEMS OR PROCEDURES.	• CRITICAL DATA ITEMS RESTRUCTURED TO REDUCE ERROR-PRONE CHARACTERISTICS • SOME RESIDUAL ERROR REMOVED, DUE TO PROBLEMATIC DELIVERY SYSTEM ASPECTS.
LEVEL III	• INSTITUTIONAL QUALITY CONTROL PROCEDURES. • CHANGES IN VALIDATION PROCEDURES TO INCREASE EFFECTIVENESS	• THROUGH CHANGES IN ROLES OR RESPONSIBILITY, OR OTHER DELIVERY SYSTEM PROCESSES, INCREASED EFFECTIVENESS OF QUALITY CONTROL TACTICS • ALTERATIONS IN ERROR-PRONE DELIVERY SYSTEMS REMOVE MOST RESIDUAL ERROR.
LEVEL IV	• MAJOR CHANGES TO DELIVERY SYSTEM THROUGH ELIMINATION OF ERROR-PRONE DATA ITEMS. • INTEGRATION OF COMPONENTS OF DELIVERY SYSTEMS.	• BY SIGNIFICANTLY RESTRUCTURING DELIVERY SYSTEM, REMOVE MOST OR ALL OF THE ERROR-PRONE COMPONENTS • RESIDUAL ERROR IN DELIVERY SYSTEM MINIMIZED.

EXHIBIT 1-2. TRANSLATING ED'S CORRECTIVE ACTION FRAMEWORK INTO A CORRECTIVE ACTION STRATEGY

action. This corrective action is short-term in its focus, holds as constant almost all parameters within the delivery system, and would require only an administrative decision to implement. In addition, the roles of individual parties (schools, ED, etc.) within the delivery system are not likely to change, nor will this corrective action require new technologies. We will discuss Level I corrective actions in Chapter 2 and will focus on significant student and institutional errors identified in Findings.

1.2.2 Level II Corrective Actions

Level II corrective actions involve changes in classes of data items or groups of procedures in the delivery system, and are similar in many ways to Level I corrective actions. The major difference between Level II and Level I corrective actions is that Level II corrective actions involve a slightly larger scope. Changing from prospective to base year income items is a Level II corrective action and is intermediate-term in focus. This action is likely to require regulatory changes to implement, and tends to work within the constructs of the existing delivery system by accepting as constant most parameters of the programs. In addition, this corrective action is not likely to change the roles of the participants, or require major changes in technology. Chapter 3 will focus on Level II corrective actions and discuss the group of prospective income data items; and, Chapter 4 focuses on a Level II corrective action that looks at a new definition of dependency status and the group of data items that constitute the new and old definitions.

1.2.3 Level III Corrective Actions

Typical Level III corrective actions would include a change in the focus of Federal oversight or quality assurance, or a change in the level at which these oversight activities are conducted. The Institutional Quality Control Pilot Project is an example of a Level III corrective action. The Pilot is intermediate to long-term in its focus and changes more aspects of the delivery systems than either of the two previous corrective action levels. By making institutions the focus of quality control, the Pilot will change the relationships between schools and ED. The Pilot involves technologies new to the current delivery system in the form of software for both institutions and ED. The Pilot has required a regulatory change and may require a legislative change to implement fully. In Chapter 5 we focus on two Level III corrective actions, institutional quality control procedures and validation of student-reported data.

1.2.4 Level IV Corrective Actions

Level IV corrective actions include major changes in the formulae used to calculate awards in the programs or integration of components of the delivery systems. These corrective actions focus on long-term activities and require substantial changes to most aspects of the programs or delivery systems. Level IV corrective actions are likely to require legislative changes to implement, could possibly redefine the roles of the participants in the systems (e.g., if processing occurred at the institution under a simplified formula), and are likely to require technologies or processing techniques that are new to the delivery system including new software, and perhaps changes in hardware. In Chapter 6 we focus on data element reduction, a Level IV corrective action that changes the structure of the programs by simplifying the formulae used to calculate need or award.

In the past, ED's corrective action efforts have focused primarily on Level I and Level II corrective actions. Even with these corrective actions, error continues to be high. ED must decide if it is willing to accept the current level of error and maintain the status quo, or address system deficiencies through Level III and Level IV corrective actions, and design error out of the system. Because future reductions of error are most feasible through Level III and Level IV corrective actions, this report emphasizes these corrective actions, including analysis of institutional quality control procedures and simplification of the delivery system and need analysis formulae.

1.3 LIMITATIONS ON ANALYSIS OF CORRECTIVE ACTIONS

The analyses of the corrective actions in this report have been designed to determine the probable causes of the errors presented in Findings. However, even with these additional analyses, there are some limitations on the extent to which they will convey underlying causal relationships, the extent to which corrective actions can be developed, and the impact simulated with the Stage Two data base.

These limitations are a result of choosing a study design that generates accurate national estimates of error rather than one that develops and fully analyzes alternative corrective actions. The study design used for Stage Two was a function of its goals and constraints. Because Stage Two sought to maximize the precision of national error estimates while minimizing the costs of the study, both in terms of financial costs as well as the burden of collecting the data, the study generated a data base that reflected these goals and constraints. The characteristics of the data base can be summarized as follows:

- It does not contain many student and institutional items that are not directly related to calculating awards or determining need.
- Institutions' responses to questions concerning institutional practices are self reported rather than generated by observation or corroboration.
- It contains only recipients of Title IV aid (e.g., received a Pell or Campus-Based award, or were certified for a GSL) and not applicant non-recipients.
- It contains a large number of students overall, but only a small number of students per institution.
- It does not contain any operational cost or burden data.

There are broad consequences of using a data base with these characteristics to develop and analyze corrective actions. First, because data on many student and institutional items not directly related to the calculation of awards were not collected, we have a limited capability to control for these items in our analyses and so are limited in our ability to determine causal relationships. In addition, we cannot fully simulate the effects of corrective actions because many data that we would need to do so are not contained in the data base. In some cases (as in the need to have income data from 2 years prior to the academic year in Chapter 5), we can make some reasonable assumptions concerning these values. In other cases, such as determining how Campus-Based awards would change under alternative corrective actions, we cannot make reasonable assumptions because the corrective actions represent a fundamental change to the environment in which awards would be made. Because we collected no cost or burden data, it is extremely difficult to estimate the costs of alternative corrective actions.

Second, because data on institutional procedures were collected through interviews with Financial Aid Administrators, we cannot control for variations in interpretation or meaning across institutions. Thus, while two different institutions may both claim that they employ sampling as a quality control procedure, in actuality their sampling procedures may be very different.

Third, because the data base contains only recipients and not applicants, we were constrained in our ability to estimate the possibility of new recipients being eligible under alternative corrective actions. This may become critical when a corrective action represents a fundamental change in the Title IV programs.

Fourth, in order to maximize the precision of the national error estimates for a given sample size, a small number of students (relative to the population of recipients at the institution) were sampled from each of a relatively large number of institutions. Consequently, no estimates are possible at the individual institutional level.

However, the Stage Two data base is unique in its ability to support analyses of corrective actions based on changes in how student items are treated. Few other data bases contain recipient and family information to the extent that the Stage Two data base does. Therefore, we have used these data in analyzing the effects of corrective actions relating to prospective income, dependency status, and a shortened need analysis formula. In the following paragraphs we discuss the types of analyses we use in each of the chapters of this report.

In Chapter 2 we develop and assess corrective actions for errors in individual student and institutional data items. The conclusions presented are limited because corrective actions for individual items are constrained within the existing constructs of the programs. For corrective actions aimed at student errors, this constraint orients corrective actions toward validation of individual items. Developing corrective actions directed at individual institutional items or procedures is further constrained by the sampling design employed by the Stage Two study. Because the study did not draw student samples that are statistically representative of the institutions from which they were drawn, we do not have the capability to fully analyze errors at the institutional level.

In Chapters 3, 4, and 6, we look at changes in program definitions. The corrective actions in Chapter 3 examine the group of prospective income items and seek to assess the effects of proposed changes in how these items are used. Chapter 4 looks at another corrective action ED has implemented since collecting data for this study: the likely effects of changing the definition used to determine dependency status. Chapter 6 looks at reducing the number of data elements used in the Uniform Methodology. All three of these chapters use a series of analyses that describe the distribution of awards or need under the new and old definitions using both reported and best data.

Finally, in Chapter 5 we look at ED's broad quality strategies of validation and institutional quality control aimed at the entire delivery system. The analyses in Chapter 5 were structured to develop corrective actions within the framework of these strategies. The presentations in Chapter 5 use multivariate regression analysis to control for factors not controlled for in Findings. We are unable to state causal relationships in Chapter 5 because we could not control for all variables, nor could we control for differences in school responses given the self-reporting of many of the explanatory factors.

2.0

CORRECTIVE ACTIONS FOR SIGNIFICANT STUDENT AND INSTITUTIONAL ERRORS

This chapter presents our analyses of significant individual errors and corresponding corrective actions. All of the corrective actions in this chapter are Level I corrective actions, dealing with only individual data items or procedures. The results are presented in two sections: significant student errors and significant institutional errors. The errors considered in this chapter were those marginal errors found to be significant in Chapter 5 of *Findings*.

Findings described the magnitude and frequency of the significant errors. In general, the analyses in this chapter are designed to go beyond *Findings*, to examine in greater detail the errors that occurred and to suggest ways of correcting them. Following is a summary of these analyses.

Corrective Actions For Significant Student Errors

A significant percentage of misreporting of home equity, savings, dependent student's assets, and other non-taxable income was due to erroneous reporting of a zero value for these data items. Of all applicants, the percentage who reported a zero value incorrectly are as follows:

Parent's home equity	**15.4%**
Independent student's home equity	**6.5%**
Parent's savings	**37.3%**
Independent student's savings	**28.7%**
Dependent student's assets	**31.3%**
Other non-taxable income	**21.6%**

The erroneous reporting of zero occurrs in items for which values may be cross-checked on the Federal tax form filed by the applicant or his/her parent(s). While none of the values of these items can be obtained directly from the tax return, the tax return can indicate situations where a data item exists when none was reported on the application. Therefore, using the Federal tax form as a source of information to determine when values should be verified -- as opposed to using the form as the source of verifying values -- should be investigated by ED.

In addition, changes in application forms and clarification of instructions could improve the accuracy of several data items, including other non-taxable income, household size, and number in college.

Corrective Actions For Significant Institutional Errors

Enrollment status errors in the Pell program suggest that institutions have difficulty calculating enrollment status correctly for non-standard students. Institutions seem to have trouble adjusting a student's enrollment status for summer sessions and when the student changes enrollment status. Also problematic is determining enrollment status for clock-hour students. These factors suggest that ED may want to issue clarifications concerning the determination of enrollment status for non-standard students.

A subset of procedural or calculation errors appears to be disproportionately distributed at a few institutions. For these institutions, sampling a relatively small group of recipients would uncover the occurrence of these systematic problems. Therefore, ED could investigate the characteristics of these institutions by drawing institution samples. (Future evaluations of the Institutional Quality Control Pilot Project, where institutions draw a representative sample of students, could be used for this investigation.) ED may also wish to design a sample in its audits of institutions that would indicate if institutions are having systematic problems with these items. Alternatively, ED could issue technical assistance or clarification concerning the problems with these items either through professional associations or through its own channels.

Error in calculating EFC in the GSL program was primarily prevalent when institutions used the GSL Tables. Because recent changes made in the GSL program no longer allow institutions to use the GSL Tables, we suspect that a large portion of this error will be removed.

Errors caused in the Campus-Based or GSL programs by institutions not estimating a Pell award for non-Pell recipients may be alleviated if ED stresses that the criteria for including Pell, when determining need in the Campus-Based or GSL programs, is strictly one of eligibility. Campus-Based or GSL applicants do not have to actually receive a Pell to use this value when determining need. The reauthorization of the Higher Education Act did contain language stressing this fact.

2.1 CORRECTIVE ACTIONS FOR SIGNIFICANT STUDENT ERRORS

Student error can occur whenever any application value reported by the student differs from the best value obtained from the most reliable source during our data collection. This subsection presents the significant student errors across the three Title IV programs discussed in Findings and our proposed corrective actions for each error. In addition, we will also discuss any relevant advantages or disadvantages that may apply to the corrective actions.

There is a large amount of residual student error that is not amenable to the short-term or "quick-fix" corrective actions proposed in the previous quality control studies. Much of this residual error cannot be corrected due to the complicated application process (e.g., multiple forms and instructions). Additionally, many of the residual student errors involve prospective information, such as expected income, household size, and number in college, that must be estimated at the time of application for the upcoming academic year. The prospective items are inherently error-prone, contributing to a large portion of the student error found in this and past quality control studies. Because prospective items cannot be verified, few corrective actions can be proposed that do not require changes in the current formulae and systems.

Corrective actions requiring these types of changes are discussed in later chapters.

There are several application items, that proved to be significant sources of student error, where short-term, or Level I, type corrective actions are feasible: non-taxable income, home equity, number in college, household size, and dependent student's assets. Each of these significant student errors and our proposed corrective actions are discussed in the following sections.

2.1.1 Incorrect Reporting of Other Non-Taxable Income

The Application for Federal Student Aid (AFSA) requests information concerning sources of other base-year, non-taxable income and benefits (welfare, child support, worker's compensation, etc.). The applicant is to provide the total amount of income from such sources. For the 1985-86 academic year, misreporting of other non-taxable income resulted in $75.1 million in net error in the Pell program, and $23.7 million in net need error in the Campus-Based programs. Much of the error in misreporting other non-taxable income involved students (or their parents) who reported zero other non-taxable income, when in fact they had such income. Table 2-1 presents the sources of other non-taxable income for the 21.6 percent of Title IV recipients erroneously reporting zero other non-taxable income. From this table we can see that untaxed portions of

TABLE 2-1

SOURCES OF OTHER NON-TAXABLE INCOME FOR TITLE IV RECIPIENTS REPORTING ZERO OTHER NON-TAXABLE INCOME, 1985-86

Source	Percent of those Reporting Zero with Positive Best Value
Married Couple Deduction	50.5
Untaxed Portions of Unemployment	17.4
Interest and Dividend Exclusions	15.8
Welfare	9.8
Child Support	7.8
Any Other Non-Taxable Income (e.g., Black Lung Benefits, excess earned income credit, etc.)	2.6
Veteran's Benefit	2.5
Pension and Capital Gain	2.0
Worker's Compensation	1.3
Railroad Retirement Benefits	0.7
Living Allowances	0.4
Job Training Partnership Act	0.3

unemployment benefits and interest and dividend exclusions are the most frequently omitted source of other non-taxable income for applicants reporting zero other non-taxable income.

The complexity of the application and instructions also contributes to this error. A student or parent completing this application could easily miss one or more of the income sources. Additionally, because these sources of income are non-taxable, they are not reported to the recipient on a W-2 or any other form. Therefore, there is a good deal of reliance upon the recipient's ability or willingness to recall these sources.

Possible Corrective Actions

Many possible sources of non-taxable income are not reported to the recipient, and he or she may not have kept records of the income. For example, total child support may not be reported to an applicant and other records would be required to determine the full amount received.

One possible corrective action for reducing the error associated with reporting other non-taxable income is to cross-check the application with the Federal tax form for those items (i.e., a married couple deduction, etc.), that may be indicated on the tax form.

Cross-checking other non-taxable income with items on the Federal tax form would uncover discrepancies only in the sources included on the

Federal tax return. These items are: a married couple deduction, interest and dividend exclusions, untaxed portions of pension and capital gains, and unemployment. However, starting with the 1987 Federal tax form, many of these non-taxable items will be deleted (e.g., married couple deduction) or they will be gradually phased out. Because of such changes in tax laws, there is a time limitation for this corrective action.

2.1.2 Incorrect Reporting of Home Equity

The AFSA requests information pertaining to the applicant's (and/or their parents') net assets. Net assets include cash, savings, and checking accounts, home equity, value of other real estate and investments, and value of businesses or farms. Of these various elements, home equity was most frequently misreported and resulted in a significant student error. For academic year 1985-86, misreporting of home equity resulted in $64.0 million in net error in the Pell program, and $22.9 million in net need error creating $16 million in awards in excess of need in the Campus-Based programs. Two types of error can occur with respect to reporting home equity, as follows:

- The applicant reports zero home equity, when in fact there is home equity; or
- The applicant reports home equity, but the reported amount is more or less than the actual home equity.

As indicated earlier, 15.4 percent of dependent students and 6.5 percent of independent students who reported zero home equity actually had a best value for home equity. For those applicants who reported zero home equity, we checked to see if they claimed any home mortgage interest deduction on their IRS Schedule A. The results of this comparison are presented in Table 2-2.

Possible Corrective Actions

Underestimating the true value of the home might occur because the applicant does not use the correct reference to determine the true value (i.e., uses the tax value or insured value rather than current market value). Short of obtaining an assessment for each home, there is little that can be done to remove this problem.

However, a corrective action that could be implemented to reduce the error associated with homeowners reporting zero home equity is to cross-check the presence of home equity reported on the application with any amount of home mortgage interest claimed on Schedule A of the IRS tax form. As shown in Table 2-2, the majority of parent's of dependent students (59.9 percent) and independent students (84.6 percent) who reported zero home equity and claimed a home mortgage interest deduction on their Federal tax returns, actually were found to have home equity present using best values. This means that claiming mortgage interest is a good indicator that a home should be listed on the application. Not all persons having a home will claim a mortgage interest deduction, either because they do not file taxes, do not itemize deductions, or do

TABLE 2-2

DISCREPANCIES IN REPORTING SELECTED ASSET ITEMS AND IRS VALUES FOR TITLE IV RECIPIENTS REPORTING ZERO, 1985-86

ITEMS FOR WHICH RECIPIENTS REPORTED ZERO VALUES	% WITH INTEREST ON IRS FORMS HAVING BEST VALUES	% WITH BEST VALUES CLAIMING INTEREST ON IRS FORMS
Parent's Home Equity (35% of all recipients reported zero)	59.9	18.2
Independent Student's Home Equity (87% of all recipients reported zero)	84.6	11.7
Parent's Savings (36% of all recipients reported zero)	55.8	25.6
Dependent Student's Assets (71% of all recipients reported zero)	46.8	12.9
Independent Student's Savings (50% of all recipients reported zero)	51.2	13.8

For example: 59.9 percent of dependent recipients whose parents reported zero home equity and claimed mortgage interest on their Federal tax return had a best value for home equity. Hence, approximately 40 percent of dependent recipients whose parents reported zero home equity and claimed mortgage interest on their Federal tax return had a best value for home equity of $0. In addition, 18.2 percent of dependent recipients whose parents reported zero home equity and had a best value claimed mortgage interest on their Federal tax return.

not pay interest on their home (i.e., it is fully paid off). However, reference to the tax form could still identify many cases (18.2 percent for dependent's parent's home equity and 11.7 percent for independent's home equity) where applicants report no home equity and actually do have home equity. While this only indicates the presence of a home, not the home equity, further questioning of the applicant would be required to determine the value.

A drawback to this corrective action is that this cross-check can only be performed for tax-filers and persons who itemize deductions. Additionally, because the tax return provides information on the previous year and the applicant reports current home equity, discrepancies will naturally occur. For example, the applicant may have sold his or her home prior to applying for financial aid. However, a comparison of the application and the tax return still can provide valuable information concerning those applicants who should be questioned further.

2.1.3 Incorrect Reporting of Savings

Applicants are required to provide information on the AFSA concerning the amount of money they or their parents have in a savings account(s) as of the date of application. For academic year 1985-86, misreporting of cash/checking/savings resulted in $1.5 million in net error in the Pell program, and -$2.8 million in net need error in the Campus-Based programs. Similiar to home equity, applicants may commit two types of errors when reporting this item: they report zero savings when they in fact have savings, or they report an amount different from what they actually have in their account(s).

As stated earlier, 28.7 percent of independent applicants and 37.3 percent of dependent applicants who reported zero savings actually had a best value for savings. We, therefore, compared zero reported savings with interest income on the Federal tax return in an effort to identify those who erroneously report zero. The results of this comparison are indicated in Table 2-2.

Possible Corrective Action

Because the instructions appear to be quite clear as to what should be included in this item, additional instructions would not alleviate the problem of misreporting savings. Therefore, one possible corrective action that could be implemented to reduce error associated with persons reporting zero savings is to compare the amount reported for savings with the presence of income interest claimed on the Federal tax form.

As shown in Table 2-2, the majority of parents of dependent students (55.8 percent) and independent students (51.2 percent) who reported zero savings and claimed earned interest income on their Federal tax returns, actually were found to have savings present using best values. As with home equity, this means that claiming earned interest is a good indicator that savings should be listed on the application. Not all persons with savings will have interest listed on their tax return. However, reference to the tax form could identify many cases (25.6 percent for dependent's parent's savings and 13.8 percent for independent's savings) where applicants report no savings and actually do have some amount of savings. This corrective action can only indicate that a savings account may exist, not the amount of savings. Further questioning of the applicant would be necessary to determine the actual amount of savings.

An additional disadvantage to this approach is that it proves only that applicants had savings in the year prior to application, not that they had savings at the time of application. However, if they reported zero savings and did claim earned income interest on their previous year's tax return, further documentation should be requested to verify the zero reported value. This approach does not provide a solution to misreporting by non-tax filers.

2.1.4 Incorrect Reporting of Dependent Students' Assets

Dependent applicants must provide information on the AFSA concerning their (and their spouse's) other assets besides the cash, savings, home value, already discussed. Some dependent students misreport assets by providing a value less than the true value of their assets, or by erroneously reporting zero assets.

As indicated earlier, 31.3 percent of the applicants who reported zero dependent student's assets actually had best values. Again we attempted to analyze this problem by comparing zero reported dependent student assets with whether they claimed interest on their Federal tax returns. The result of the analysis is presented in Table 2-2.

Possible Corrective Actions

Because of the similarity of this error with the previously discussed errors associated with assets (i.e., home value and savings) we suggest the same corrective action be applied to misreporting of dependent student's assets. Institutions should cross-check the value reported by the applicant with any interest claimed on the Federal tax form for selected students. As shown in Table 2-2, interest claimed is a good indicator of dependent's net assets since nearly half of the applicants (46.8 percent) who reported zero for dependent student's assets and had earned interest income on their tax forms, actually were found to have an amount present using best values for this data item. Because many dependent students do not file tax returns, not all students with net assets will be identifiable in this manner. However, by referencing the tax returns, institutions could identify several cases (12.9 percent) where applicants have reported zero dependent student's assets and actually have assets. Again, this comparison would only indicate that some assets should have been reported on the application, not the value of the assets. Further questioning of the applicant would be required to determine the value.

2.1.5 Incorrect Reporting of Household Size

At the time of application, students are required to project their family size for the upcoming academic year. Misreporting family size is a significant student error. As with expected income, estimating the family size is inherently error prone due to the flexibility of family plans and circumstances. This student-reported item was a significant error in the Title IV programs, resulting in $29.9 million in net error in the Pell program, and $58.7 million in net need error in the Campus-Based programs. In Pell, for example, incorrect household size was the sixth largest source of student error.

For purposes of this study, verifying household size involved asking the student and/or parent (during a personal interview) what number they had reported on the application for expected household size, what the actual number was, and the reason(s) for any changes. We also abstracted household size information from documentation contained in the student's institutional file.

In order to analyze errors in household size, we compared the number on the application the student stated they expected to be in the household during the school year to the actual number in the household during the year. Insight into possible corrective actions is provided by comparing these values to the student's statement concerning an unanticipated change in household size.

Table 2-3 presents the percentage of recipients who misreported family household size by whether there was or was not an unanticipated change in family size. As shown in Table 2-3, 90.2 percent of the recipients had no unanticipated change, i.e., there was no change between

TABLE 2-3

CHANGES IN REPORTED HOUSEHOLD SIZE (NOT INCLUDING UPDATES), ALL TITLE IV PROGRAMS, 1985-86

	REPORTED LESS THAN BEST VALUE (PERCENT)	REPORTED GREATER THAN BEST VALUE (PERCENT)
No Unanticipated Change (90.2% of Recipients)	70.4	60.4
Unanticipated Change (9.8% of Recipients)	29.6	39.6
TOTAL	100.0	100.0
Independents		
No Unanticipated Change (92.6% of Independents)	66.1	59.9
Unanticipated Change (7.5% of Independents)	33.9	40.1
TOTAL	100.0	100.0
Dependents		
No Unanticipated Change (88.6% of Dependents)	73.4	60.5
Unanticipated Change (11.4% of Dependents)	26.6	39.5
TOTAL	100.0	100.0

For example: 70.4 percent of recipients whose reported household size was less than their best household size did not have an unanticipated change that could have explained the difference.

the household size the student anticipated for the academic year, and what actually occurred. An unanticipated change occurs when, for example, a family member moves in or out of the household, a divorce, a separation, or a death occurs. Dependent students have a slightly larger percentage (11.4 percent) of recipients who did have an unanticipated change in household size as compared to independents (7.5 percent).

Of the recipients who reported a household size value less than the best value, 70 percent of the recipients did not have unanticipated change in their household size. This type of error, because it works against the student, most probably is the result of careless completion of the application or not understanding the question (e.g., not including the applicant, another student, grandparents, etc., who are living with the family).

Of the recipients who overestimated their household size (i.e., reported values were greater than best values), almost 40 percent experienced unanticipated changes in their household size between the time of application and verification. The remaining 60 percent who reported a household size greater than best value had no unanticipated change in their household. Thus it is not true that household size error is caused by circumstances beyond the control of the recipient. This is true for recipients who report a household size less than best as well as for recipients who report a household size greater than best.

Although the percentage of independent and dependent students who had unanticipated changes in household size was quite small, each made a large contribution to over-reporting error. The 7.5 percent of independent students with unanticipated changes contributed 40.1 percent of the error attributable to reporting a household size larger than the best value. Similarly, the 11.4 percent of dependent students who had unanticipated changes in household size contributed 39.5 percent of the error for reporting a value greater than the best value.

For independent recipients who had an unanticipated change in their household size, the most commonly cited reason was having been married after applying for financial aid. For dependent recipients with a change in household size, a household member moving out of the household was the most frequent change. Independent and dependent recipients' responses for the primary reason for an unanticipated change in household size are presented in Table 2-4.

Possible Corrective Actions

There is some difficulty in projecting household size into the upcoming academic year because the application is completed prior to the start of the academic year and updated at the time of enrollment. Additionally, family circumstances and plans can change rapidly, affecting this prospective data item as is indicated by the large proportion of household size misreporting attributable to unanticipated changes. There are three proposed corrective actions that may reduce the error associated with reporting on this data item. They are the following:

- Change the definition of household size to equal number of exemptions.

TABLE 2-4

PRIMARY REASON CITED BY RECIPIENTS FOR UNANTICIPATED CHANGES IN HOUSEHOLD SIZE IN ALL TITLE IV PROGRAMS, 1985-86

Reason For Change In Household Size	Recipients With Unanticipated Changes	
	Independent (Percent)	Dependent (Percent)
New Addition to Family	15.5	10.0
Got Married	28.5	23.0
Someone Moved Out	17.5	36.4
Someone Moved In	16.8	7.0
Support Plans Changed*	0	4.6
Separated/Divorced	18.3	11.9
Death in Family	1.9	5.2
No Answer	1.5	1.8

*Change in plans to provide or not provide at least one-half support to others.

- **Require that institutions obtain a completed Verification Worksheet from each applicant, which requests a listing of household members by name, age, relationship, and the name of the college they attend, if applicable.**
- **Use the number of exemptions claimed on the Federal tax return as a verification edit when exemptions are smaller than household size.**

Change the Definition of Household Size to Equal the Number of Exemptions

Given the inherent difficulty in projecting household size, a corrective action would be to use base-year data (i.e., the number in the household at the time of application) to determine household size. Using the number of exemptions reported on the Federal tax return as the number in household results in values similar to the number in the household at the time of application. (We did not collect data on the actual number in household at the time of application because this value was not used in determining awards under the current program specification. Rather, we collected and used the number at the time of application, that the student expected to be in the household during the school year.) We performed a simulation comparing best values with reported household size and number of exemptions. The results are presented in Table 2-5.

The reported values were equal to best values for 77 percent of applicants, while the number of exemptions was equal to best values for 68 percent of applicants. The main problem with using exemptions is that a larger percent of students (19 percent) would have the amount of aid awarded based on a household size smaller than it would have been. When using reported values, only 8 percent of students would have a value less than best values.

TABLE 2-5

ACCURACY OF REPORTED HOUSEHOLD SIZE AND TAX FORM EXEMPTIONS AS COMPARED TO BEST VALUES ALL TITLE IV PROGRAMS, 1985-86

	REPORTED LESS THAN BEST VALUE (Percent)	REPORTED EQUAL TO BEST VALUE (Percent)	REPORTED GREATER THAN BEST VALUE (Percent)
Reported Household Size	8	77	15
IRS Exemptions	19	68	13

Require That Institutions Obtain a Completed Verification Worksheet From Each Applicant

This corrective action is directed at those students who had anticipated a change in household size but still misreported household size. Updating, by asking if anything has changed, does not solve the initial misreporting. A more comprehensive and detailed listing of household size might help reduce error for these persons. The Verification Worksheet contains a section where applicants are to provide information concerning the people in their household including their name, age, relationship and the college they attend if applicable. An advantage to this approach is that the Verification Worksheet is an existing document and would not require any revisions. A disadvantage is that currently, only those students flagged for verification complete these forms if requested by their institution. Currently, the institutions have the choice of using the Verification Worksheet or a worksheet they have developed instead. This approach would require that all institutions use the Verification Worksheet, removing all discretion from the institution. The burden associated with this corrective action would be extremely high and might not be allowed under reauthorization.

Use the Exemptions or the Federal Tax Return as a Verification Edit

The Federal tax return could be used as an edit for verifying household size when the number of exemptions on the tax return is smaller than the household size reported on the student's application. Selecting applications to verify according to this criteria would identify those applications where it was most likely a serious error in household size occurred, and where a potentially large overpayment could result.

2.1.6 Incorrect Reporting of Number in College

Title IV applicants are required to report the number of household members who will be enrolled in postsecondary education. Misreporting of number in college resulted in $18.4 million in net error for the Pell program and $26.5 million in net need error for the Campus-Based programs. Misreporting resulted more often in overstatements of need in the Campus-Based programs and more overawards for the Pell program.

Table 2-6 presents the percentage of recipients who misreported number in college by whether or not there was an unanticipated change in the number of household members attending college. As shown in Table 2-6, 94.4 percent of the applicants had no unanticipated change between the number in college the student anticipated for the academic year, and what actually occurred. Of the recipients who reported a number in college lower than the best value, 22.6 percent experienced unanticipated changes. Of the recipients who overestimated the number in college (i.e., the reported value was greater than the best value), 41.0 percent had unanticipated changes that affected the number in their household in college. Dependent students have a slightly larger percent (6.9 percent) of recipients who had an unanticipated change in the number in college as compared to independents (3.6 percent).

TABLE 2-6

CHANGES IN REPORTED NUMBER IN COLLEGE, ALL TITLE IV PROGRAMS, 1985-86

	REPORTED LESS THAN BEST VALUE (PERCENT)	REPORTED GREATER THAN BEST VALUE (PERCENT)
No Unanticipated Change (94.4% of Recipient)	77.4	59.0
Unanticipated Change (5.6% of Recipients)	22.6	41.0
TOTAL	100.0	100.0
Independents		
No Unanticipated Change (96.5% of Independents)	47.8	59.6
Unanticipated Change (3.6% of Independents)	52.2	40.4
TOTAL	100.0	100.0
Dependents		
No Unanticipated Change (93.1% of Dependents)	89.8	58.9
Unanticipated Change (6.9% of Dependents)	10.2	41.1
TOTAL	100.0	100.0

For example: 77.4 percent of recipients whose reported number in college was less than their best number in college did not have an unanticipated change that could have explained the difference.

Possible Corrective Actions

As indicated in Table 2-6, 22.6 percent of recipients reporting less than best value and 41.0 percent reporting greater than best value had an unanticipated change in the number of household members in college. Both are significant percentages of error. Because unanticipated changes cannot be controlled, the only corrective action that might reduce these types of errors would be to use the base-year values (i.e., the value at the time of application) for number in college. A simulated comparison between base-year and best values for the current year should be made to determine the accuracy of base-year data. We do not have data for base-year number in college since it is not part of the current award determination and, therefore, cannot make this comparison. As with household size, we propose corrective actions aimed at reducing error associated with students having no unanticipated changes.

The question and instructions on the application, about number in college, are uncomplicated. This results in few questions about how to include dependent children who are enrolled at least half time.

Suggested corrective actions to address the error associated with reporting the number in college are the following:

- Require that institutions obtain a completed Verification Worksheet from each applicant which requests a listing of household members by name, age, relationship, and the name of the college they attend, if applicable.
- Verify all applicants who report more than one (including the applicant) in postsecondary education.

Require That Institutions Obtain a Completed Verification Worksheet From Each Applicant

This is the same corrective action discussed in the previous section.

Verify All Applicants Who Report More Than One in Postsecondary Education

Another approach to reducing the number in college error is verifying all applicants who report more than one family member in college. However, this would have required that for the 1985-86 academic year, 1,344,852 (or 30 percent) of the applicants be verified for number in college. ED will have to consider whether they want to place this burden on the institutions and the applicants.

2.2 CORRECTIVE ACTIONS FOR SIGNIFICANT INSTITUTIONAL ERRORS

The analyses presented in Findings indicated that institutional errors were significant in the Pell, Campus-Based, and GSL programs. In many cases, while the frequencies of institutional errors were low, the effects of these errors were large. Those institutional errors that were significant in Findings, and that we discuss in this section, are the following:

- Enrollment status error in the Pell Grant program, which occurred for 18.2 percent of Pell recipients totalling $100.9 million in underawards and $110.5 million in overawards;
- A composite index of Pell calculation error, Campus-Based initial overawards and disbursement error, and GSL initial overawards and errors in factoring other aid;

- EFC error in the GSL program (6.2 percent of GSL certifications and $260.0 million in certification error); and
- Institutional Campus-Based and GSL errors caused by errors in handling Pell awards (22.7 percent of Campus-Based recipients for $174.5 million in absolute need error and 3.8 percent of GSL certifications for $84.6 million in certification error).

There are several basic types of corrective actions that can be considered for these types of errors. These corrective actions include clarifications issued by ED for procedures institutions should follow, providing technical assistance tools to help schools conduct procedures more accurately, and modifications to the procedures institutions follow in order to make them simpler and less error-prone. The corrective actions for the institutional errors identified above include all three of these. The errors mentioned above, and corresponding corrective actions are discussed in the following sections.

2.2.1 Pell Enrollment Status Error

Tables 2-7 through 2-9 present a breakdown of Pell enrollment status error by three factors that would likely affect an institution's ability to calculate their students' enrollment status correctly. The factors are the credit system used by the institution, summer session attendance, and changes in enrollment status. The results generated when analyzing enrollment status error by these three factors suggest that higher rates of enrollment status error are prevalent in situations where calculating the proper enrollment status is more complicated than usual.

Table 2-7 shows that students at clock hour schools are more likely to have an enrollment status error than students at credit hour institutions. In particular, this problem is noticeable in underawards where the error rate for students at clock hour schools is nearly four times the rate of enrollment status underawards for students at credit hour institutions. This result is not surprising given that the vast majority of recipients attend a credit hour school and, consequently, the regulations are directed at credit hour schools. Attempting to fit clock hour schools into the framework developed for credit hour schools results in confusing and hard to follow regulations.

Table 2-8 shows that students enrolled in a program or institution that required them to attend a summer session had an enrollment status error 61.7 percent of the time. Students who attended a summer session, but were not required to, had a 28.5 percent error rate, while students who were not required to and did not attend summer sessions had a 13.6 percent error rate. The high error rate for students required to attend summer sessions results from a high rate of overawards. This indicates that institutions are not reducing Pell awards in situations where students do not attend required summer sessions or where their attendance is at a reduced level compared to the regular-term sessions. The high rate of underawards for students attending optional summer sessions means that institutions may not be allowing attendance at summer sessions to increase awards in cases where the student had not yet received their scheduled full-time award. High error rates associated with summer sessions may also occur because summer sessions are usually structured very differently than regular term sessions, so that calculating enrollment status properly can prove difficult.

TABLE 2-7

ENROLLMENT STATUS ERROR BY CREDIT SYSTEM, 1985-86

	NO ERROR (Within $50) (Percent)	UNDERAWARD (Percent)	OVERAWARD (Percent)
Credit Hours (88.7% of Recipients)	83.6	6.4	10.0
Clock Hours (11.3% of Recipients)	66.8	23.4	9.8

TABLE 2-8

ENROLLMENT STATUS ERROR BY SUMMER SESSION ATTENDANCE, 1985-86

	NO ERROR (Within $50) (Percent)	UNDERAWARD (Percent)	OVERAWARD (Percent)
Summer Session Required (3.5% of Recipients)	38.3	9.1	52.6
Summer Session Optional, Student Attended (7.2% of Recipients)	71.5	23.3	5.2
Summer Session Optional, Student Did Not Attend (89.3% of Recipients)	86.4	5.0	8.6

Finally, Table 2-9 shows that students whose enrollment status changes, and part-time students, have significantly higher rates of enrollment status error than full-time students whose enrollment status does not change. In particular, the high rate of overawards for students whose enrollment status changes indicates that students decrease enrollment status more often than increase. Enrollment status error is significantly higher for part-time students and students who, for one reason or another, have changes in their enrollment status. For these students, enrollment status is more complicated to calculate.

Possible Corrective Actions

The analyses of Pell enrollment status error suggest that, in general, institutions determined enrollment status relatively well. Only when institutions were determining enrollment status for non-standard students (i.e., students at clock hour schools, students who attended a summer session, students who did not attend a summer session but were required to, and part-time students or students whose enrollment status changed) did error rates significantly increase. This pattern would suggest that ED might need to take several possible corrective actions including the following:

- Clarify the procedures for determining enrollment status at clock hour institutions or simplify the process for doing so
- Instruct schools on the types of situations or students that are likely to have an enrollment status that is difficult to determine, and

TABLE 2-9

ENROLLMENT STATUS ERROR BY CHANGES IN ENROLLMENT STATUS, 1985-86

	NO ERROR (Within $50) (PERCENT)	UNDERAWARD (PERCENT)	OVERAWARD (PERCENT)
Full-Time Students With No Changes in Enrollment Status (67.1% of Recipients)	94.0	4.6	1.4
Part-Time Students With No Changes in Enrollment Status (4.0% of Recipients)	61.0	20.3	18.7
Full-Time and Part-Time Students With Changes in Enrollment Status (28.9% of Recipients)	62.6	8.9	28.5

- **Clarify the allowances for summer session attendance in the cases where summer session is not required and also where schools are not combining properly the required summer session enrollment status with the regular term enrollment status.**

The patterns of error for enrollment status are not new. Historically, determining enrollment status at clock hour institutions or for students with status changes has been difficult. These historical patterns may suggest that any corrective actions short of restructuring the method of determining enrollment status might be of limited impact. For example, given the extensive problems in determining enrollment status in summer sessions, it might be better to calculate enrollment status based just on regular-term sessions by not allowing for adjustments based on summer session.

2.2.2 Composite Analysis of Procedural Errors

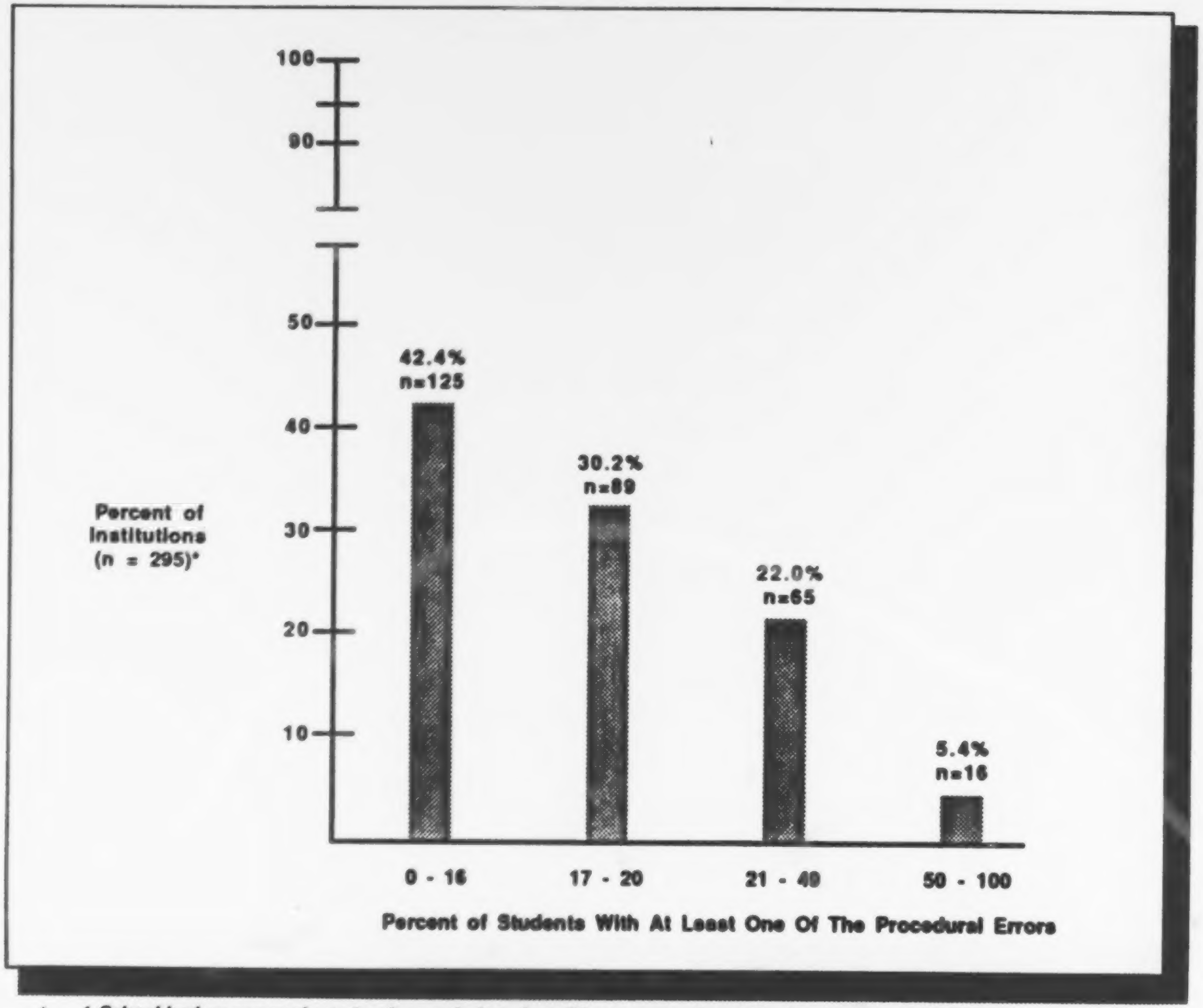
We have combined five institutional errors (Pell calculation errors, Campus-Based initial overawards, Campus-Based disbursement error, GSL initial overawards, and errors in factoring other aid in the GSL program) in one composite analysis. These five errors are similar in that they all relate to problems in disbursing aid or coordinating all sources of aid. While the errors occur relatively infrequently, when they do occur they tend to have relatively large payment consequences and so are worth considering.

The relatively low occurrence of these errors posed difficulties for our analysis. The fact that the error rates were so low meant that breaking down the error rates by meaningful factors was nearly impossible. Because of this, bivariate and multivariate analyses were not feasible.

In order to analyze these errors as a group, we developed an index that enabled us to examine the extent to which the errors clustered at institutions to see if a few institutions might be causing a disproportionately large amount of the errors. Our initial analyses using this composite index suggested that while many schools had no errors of this type, a few schools had systematic problems in this area. These few schools were associated with an unusually large proportion of the errors. Exhibit 2-1 summarizes the results of our analysis. This exhibit shows that 42.4 percent of the schools had no sampled students with any of these errors. At the other extreme, 5.4 percent of the schools had 50 percent to 100 percent of the sampled students with at least one of the five errors. These results, while suggesting an underlying relationship, do not confirm the existence of a statistical relationship. We cannot infer a statistical relationship because we drew a student sample, not an institution sample. Sample sizes at individual institutions were simply too small to estimate institution-specific error rates.

Possible Corrective Actions

This group of composite errors is a significant component of institutional error in the Pell, Campus-Based, and GSL programs. In spite of this, because of the low incidence of these errors and because we did not draw institution samples, developing corrective actions for



* *1 School had no respondents (each sampled student did not respond) and 2 schools were combined because there was only 1 IQ for both schools.*

EXHIBIT 2-1. DISTRIBUTION OF ERROR RATES FOR COMPOSITE INDEX OF PROCEDURAL ERRORS

these errors is extremely difficult. However, because our analyses suggested that these errors may be disproportionately distributed across institutions, and because our analyses in Chapter 5 suggest some strong relationships with institutional quality control procedures, the Institutional Quality Control Pilot Project, where schools draw institutional samples, could be used in future Pilot years to further examine this composite group of errors. Given the systematic nature of the errors at the schools where they do occur, a relatively small sample could identify the existence of these types of disbursement and coordination problems. A small sample designed to uncover these errors could be incorporated in ED's audits of institutions. Alternatively, ED could develop technical assistance materials on how schools could identify these errors when they occur systematically. These technical assistance materials could be based, in part, on the sampling procedures contained in the Pilot project. The technical assistance materials could be distributed through professional associations (which could also focus on training institutions in detecting these errors) or through ED.

2.2.3 GSL EFC Error

Error in determining the correct EFC was significant in the GSL program. This error occurred primarily in cases where schools used the GSL Tables to determine the EFC. Table 2-10 shows that students whose EFC was determined using the GSL Tables had a GSL EFC error 26 percent of the time compared to 8.5 percent for Campus-Based need analysis and 0.3 percent when the AGI was less than $30,000. Error in the GSL Tables

TABLE 2-10

INSTITUTIONAL GSL EFC ERROR BY TYPE OF NEED ANALYSIS SYSTEM, 1985-86

NEED SYSTEM	EFC ERROR		
	Percent	Mean ($)	Total ($ Millions)
Campus-Based Need Analysis (7.3% of Recipients)	8.5	955	20.6
GSL Tables (20.8% of Recipients)	26.0	1,199	226.7
AGI Under $30,000 - No Need Analysis (72.0% of Recipients)	0.3	1,701	12.7

accounted for $226.7 million of the $260 million in total GSL EFC error. Recent changes made in reauthorization of the Higher Education Act will require all GSL applicants to go through full need analysis and do not allow schools to use the GSL tables. Because of this change, we anticipate that the majority of the GSL EFC error will be removed.

There are several possible reasons why the GSL Tables could be associated with such a significant portion of the GSL EFC error. These possibilities include the following:

- Institutions misread or misused (e.g., not prorating properly) the GSL Tables, thus determining an incorrect EFC;
- Institutions adjusted the value they read from the GSL Tables, causing an incorrect EFC; or
- An institution stated it used the GSL Tables to determine EFC when, in fact, the institution used another method.

Any of these reasons would cause an error, and all three likely contributed to the large amount of GSL EFC error.

2.2.4 Campus-Based and GSL Institutional Errors Caused by Errors in Handling Pell Awards

Federal student financial assistance is designed so that students' first level of support comes from the Pell program. Other programs should only be used if there is need remaining after the Pell Grant (to which the student is entitled) has been subtracted from cost. Consequently, the incorrect handling and distribution of Pell Grant awards can cause further errors in both the Campus-Based and GSL programs.

In Findings, errors in factoring Pell awards were identified as having a large marginal impact on institutional error in both the Campus-Based and GSL programs. The error was defined as the difference between the Pell award used by the institution in determining Campus-Based need or the GSL certification amount, and the award that should have been used based on reported SAI, best cost of attendance, and best enrollment status. In the Campus-Based programs, error in factoring Pell awards was the largest institutional marginal error in terms of both percentage of cases in error (22.7 percent) and absolute need ($174.5 million). However, its impact on awards in excess of need was far lower, only $2.9 million. Error in factoring Pell awards was the fourth highest GSL institutional marginal dollar error, occurring in 3.8 percent of cases for a total of $84.6 million.

Errors in factoring or handling Pell awards can be caused by three factors:

- An institutional error committed when disbursing the Pell award
- A difference between the Pell disbursement amount and the award used to calculate need or certification, or
- Failure to subtract from cost the Pell a student was entitled to but did not receive in determining need for the Campus-Based and GSL programs.

Institutional errors made during Pell awards which affect the other programs are merely a function of the interrelationship between the programs. Thus, these errors are not actually a Campus-Based or GSL problem. Differences between the Pell award actually disbursed and the award used in calculating need is probably caused by changes in Pell occurring during the award year. Since need is usually determined at the beginning of the year, any change in the expected Pell award can lead to differences between the Pell disbursed and the Pell used.

This error becomes a problem only if the difference caused need to fall below award or certification amount. Changes occurring after the beginning of the program year that affect only the amount of excess need can be ignored since it is unlikely that schools would repackage awards based on the new need during the year. The fact that there was a small amount of awards in excess of need associated with errors in factoring Pell awards, even though there was a high amount of need error, may indicate that in the Campus-Based programs institutions are accounting for Pell changes that cause need to fall below award but are ignoring those that affect only unmet need.

The errors discussed above relate primarily to Campus-Based and/or GSL recipients that also receive a Pell award. Because Pell is always supposed to be awarded before other Title IV aid, institutional errors in factoring Pell awards can also occur for Pell non-recipients. Table 2-11 demonstrates that in the Campus-Based programs, 9.1 percent of Pell non-recipients were in fact eligible to receive Pell awards, based on reported data. Of these 9.1 percent, institutions committed an error 69.2 percent of the time by failing to include the Pell award to which the student was entitled in the calculation of need. This failure caused an estimated $31.7 million in need overstatements which account for 18.2

TABLE 2-11

ERRORS IN FACTORING PELL AWARDS IN THE CAMPUS-BASED AND GSL PROGRAMS FOR NON-PELL RECIPIENTS, 1985-86

	PERCENT PELL ELIGIBLE	ERROR AMONG PELL ELIGIBLES		
		Percent	Mean ($)	Total ($ Millions)
Campus-Based*	9.1	69.2	1,187	31.7
GSL	8.0	14.6	751	19.9**

* Error results in overstatements of need only.

** Due to a revision in the estimate of total GSL loan volume, these figures should be reduced by approximately 10 percent.

percent of the absolute need error and 44.7 percent of the need overstatements associated with errors in factoring Pell awards. However, the awards in excess of need was far smaller. The comparable figures for GSL are that 8 percent of Pell non-recipients were eligible to receive Pell awards with institutions failing to consider their Pell eligibility in calculating the GSL certification 14.6 percent of the time. This resulted in $19.9 million in GSL institutional certification error, 23.5 percent of the error associated with incorrectly factoring Pell awards.

Possible Corrective Actions

The figures discussed above indicate that institutions, particularly in the Campus-Based programs, are not properly assessing Pell eligibility before calculating need. Most likely the institutions are relying on the Pell award the student is actually expected to receive to determine their Pell eligibility for inclusion in the other Title IV programs. It must be impressed upon institutions, therefore, that the criteria for including Pell in the determination of need for the Campus-Based and GSL programs is eligibility and not the actual receipt of an award.

3.0

ANALYSIS OF PROSPECTIVE INCOME DATA

Recent changes made by Congress in the Title IV programs do not allow for prospective income data to be used in determining either awards in the Pell Grant program or need in the Campus-Based programs except for dislocated workers. Changing the treatment of prospective income items is a Level II corrective action. This corrective action will affect larger aspects of the delivery system as well as a larger portion of residual error than the corrective actions for the data items presented in Chapter 2. This chapter presents our analyses of the likely effects of the change from prospective to base year income in the Pell and Campus-Based programs. Our findings indicate the following:

- Campus-Based need using base year income data will be substantially different than Campus-Based need using prospective income data.
- Both the apparent and actual changes in need resulting from the move to base year income data cause a downward shift in need in the Campus-Based programs.
- Independent students' need error rates in the Campus-Based programs attributable to income using base year data are less than half of the error rates using prospective data.
- Fewer than 20 percent of Pell recipients are affected by the change to base year income data (not including Special Condition filers).
- The current method of selecting which Pell recipients should have their awards based on prospective income is in error approximately 29 percent of the time (15.7 percent of Pell recipients use prospective income when they should not and 13.1 percent do not use it when they should).
- The change affects Pell recipients with low awards the most.
- Dependent student income error in the Pell program using base year data declines approximately 25 percent (from 16 to 12 percent).

Because error decreases substantially when using base year data, this change is likely to be judged favorably in spite of the other distributional effects. The above findings are presented in detail in the following sections.

3.1 BACKGROUND

Prior QC studies have indicated that prospective data in general, and specifically prospective income items, are highly error-prone and result in considerable payment or need error. Current Federal and other applications require applicants and families to estimate data for the year in which they will receive student aid. Studies have shown that these estimates are, at best, subject to changes in circumstance over time (as suggested in the preceding chapter) and, at worst, to conscious manipulation or misestimation.

Prospective items used in the current formula include household size and number in college for all applicants, income for certain dependent students applying for Pell Grants, and taxable and non-taxable income for all independent students applying for Campus-Based assistance. Prospective income has been one of the largest sources of error in the Campus-Based programs despite the fact that fewer than half of all Campus-Based recipients are independent.

With the recent reauthorization of the Higher Education Act, Congress altered the formula for determining Campus-Based need for independent applicants and for determining Pell Grant eligibility for certain dependent students. The Title IV Quality Control Project provides a unique data base with which to conduct analyses of the effects of changing from prospective to base year income data because the data base contains both reported and best values. Other analyses have been conducted using reported prospective and base year income. These reported data are subject to error and thus analyses using these data can only estimate the apparent effects of the change. The Title IV QC data base can estimate both the apparent and true effects. True effects can be estimated by using best data in the analysis, thus removing from the analysis distortions caused by reporting error.

Clearly, the changes mandated by reauthorization will affect the Uniform Methodology (UM) to a greater extent than the Pell Grant Family Contribution Schedule (FCS). The changes will affect the UM need in the Campus-Based programs for all independent students, which represent slightly less than one-half million recipients. The changes will also affect nearly 20 percent of the 2.8 million Pell recipients. These changes will have potential impact on a large number of students. Thus the analysis presented here addresses three questions that are particularly relevant to policy makers:

- Does the base year income data achieve intended effects better than prospective year data?
- How are current recipients affected by these changes?
- How will the error rate be affected by these changes?

We approach this analysis with the assumption that Congress altered the UM for independent students and the FCS for dependent students in response to the pervasive problem of high error associated with prospective income. There is no indication that Congress acted with other motives such as a desire to change the fundamental income measure on which awards are based. This motivation suggests a testable research question, i.e. will base year data result in a distribution of UM need or Pell awards that is closer to the intended distribution (as produced by best prospective data) than reported prospective data. This question can be addressed in the Campus-Based programs by ranking the alternatives (e.g., base year reported or base year best) on the basis of their deviation from UM need using the best prospective model.

Unlike the UM, the Pell program uses a "trigger" to select the cases for which prospective data will be used. The trigger selects students determined by their best prospective year income data. Because of this aspect of the Pell program, a different analysis is appropriate. Rather than ranking, we can address the question of whether the prospective income "trigger" is accurately selecting dependent students for whom prospective income should be used.

In addition, the effects of the changes in the Pell and Campus-Based programs can be described by analyzing the shifts in need, by level of need or award. This analysis will identify the subpopulations that are affected most. Lastly, we examine the likely impact on error of the changes in determining UM need or Pell award.

3.2 EFFECTS ON CAMPUS-BASED RECIPIENTS

The effects of changing to base year income in the UM can be determined most meaningfully by using Campus-Based need to measure the change. We estimated need changes by holding all other components of need (e.g., cost, other aid, etc.) constant at reported values and replacing the original UM EFC with an EFC recalculated using base year data for independent students. Thus, the changes analyzed in this section are the result of EFC changes. The following subsections deal with each of the three policy questions listed above.

3.2.1 Ranking the Models

Using an index of deviation from need determined with best prospective data, we can rank each of the models (e.g. reported prospective, best base year, and reported base year) to determine which alternative results in the smallest differences. This ranking will determine whether replacing prospective income with base year moved the UM closer to the distribution of need intended under the current formula. Table 3-1 below presents the results of this ranking.

TABLE 3-1

RANKING THE MODELS BASED ON DISTANCE FROM BEST PROSPECTIVE NEED, 1985-86

MODEL	DISTANCE[1]
Reported Prospective	1776
Best Base Year	2233
Reported Base Year	2258

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[1] Appendix A describes, in detail, arithmetically how these distances were computed.

The above differences can be interpreted as weighted mean absolute dollar differences in need for independent students. These differences indicate that the difference between the distribution of need obtained with best prospective and reported prospective data is smaller than for either best or reported base year income. This suggests that while substantial differences exist between all the models and the best prospective model, the model using reported prospective data is slightly superior to the other models in achieving the distribution of need intended under the current UM.

3.2.2 Effects on Current Recipients

The UM uses prospective income to determine need for independent students because of potentially large year to year differences in income. Thus, the effects will be greatest for those independent students whose income changes substantially between the base year and the prospective year. Analysis of the likely effects resulting from the shift from prospective to base year income for independent students must distinguish between the apparent and the true effects. Apparent effects result from a comparison of base and prospective models using reported data. These are not true effects since these data contain reporting error that distorts the distribution of need in the population. Thus, true effects can only be measured when best data are used.

Exhibit 3-1 displays the apparent effects using base year reported data to determine need for independent students. (Table B-1 in Appendix B provides additional information.) This figure presents the percentage of recipients according to the need they had under the two models. Exhibit 3-1 indicates that the majority of the recipients lie on the diagonal, as indicated by the cells with the largest blocks. Over 60 percent of all the recipients have approximately the same need under both models using reported data. However, it is clear from the exhibit that more recipients demonstrate less need under the base year model. About 27.3 percent demonstrated less need (fell below the diagonal) and 10.7 percent more need (above the diagonal). Some 26 percent of those demonstrated little or no need under the prospective model (e.g. below $200) demonstrated need under the base year model. This results from a relatively low base year and higher prospective year income and represent potential newly eligible recipients. Since students who demonstrate need are not guaranteed Campus-Based funds, it is not possible to determine if they would receive funds. Almost 5 percent of those who demonstrated little or no need under the prospective model demonstrated more than $5,000 in need under the base year model (0.61 of the 11.9 percent of recipients with $200 or less need using reported prospective data). About 9 percent of those who demonstrated need less than $200 under the prospective model demonstrated need greater than $200 under the base year model.

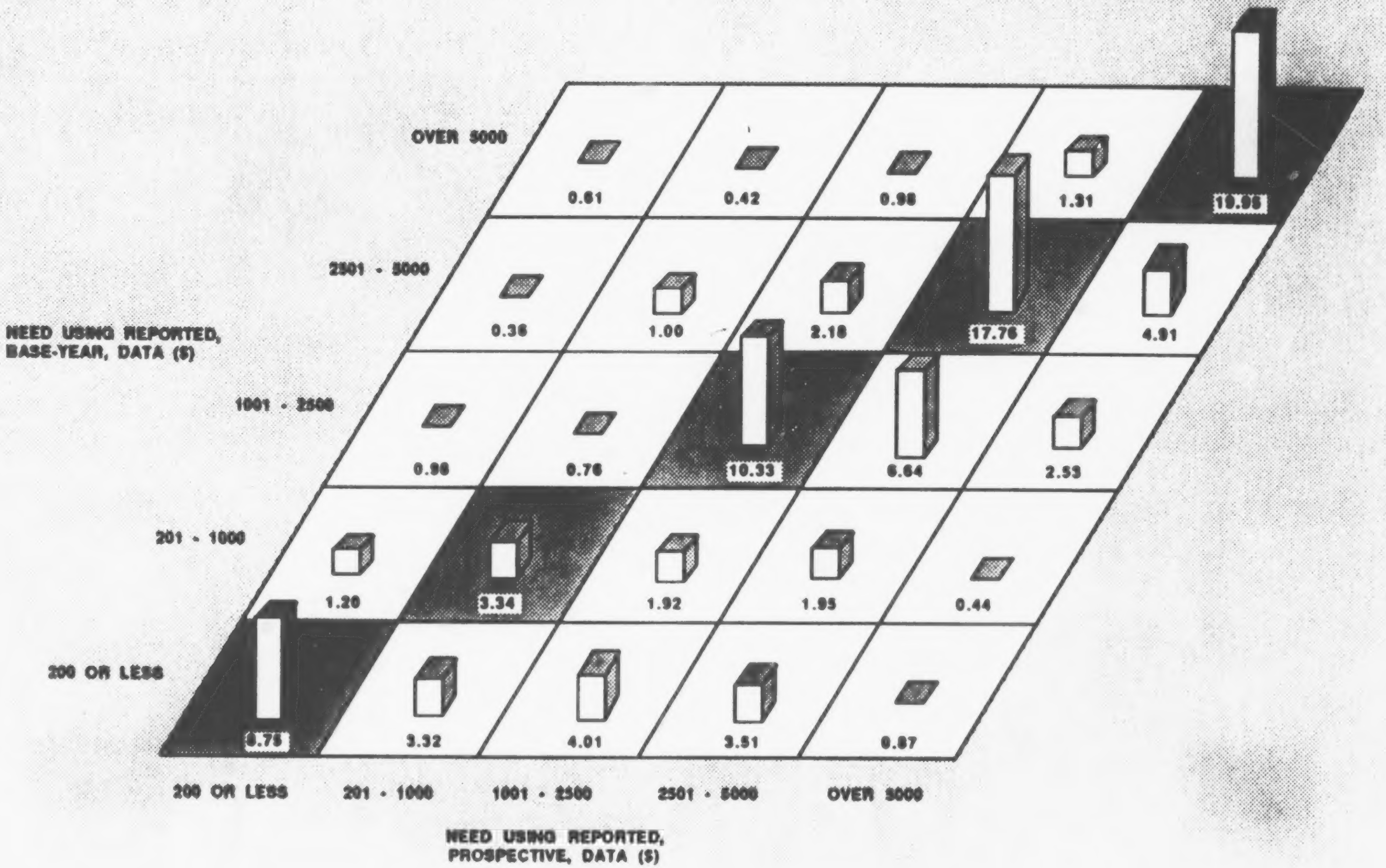

EXHIBIT 3-1. COMPARISON OF CAMPUS-BASED NEED UNDER PROSPECTIVE AND BASE-YEAR MODELS USING REPORTED DATA -- INDEPENDENT STUDENTS (PERCENTAGE BLOCK CHART)

Analysis using best data, represented in Exhibit 3-2, indicated that the true effects are greater than the apparent effects. (Table B-2 in Appendix B presents more data.) This exhibit shows that fewer recipients receive about the same awards using best data than using reported data. About .6 percentage points fewer recipients, or 54 percent, had approximately the same need under both models using best data. Those recipients who moved from no or little need under the prospective model to demonstrating greater than $200 need under the base year model increased to 32 percent (5.86 of the 18.21 percent of recipients with $200 or less need using best prospective data). Five percent of those demonstrating little or no need under the prospective model demonstrated over $5,000 need under the base year model.

3.2.3 Effects On Error

Another of the potential effects of shifting from prospective to base year income is an increase in the accuracy of the data. Base year data are verifiable with IRS or employer records while prospective data are not. Table 3-2 presents the need error attributable to income under the base year and prospective income models. (Need error is the difference in need calculated using reported and best values.) The error rate under the base year model is less than half (24.7 percent) the error rate for the prospective model (56.2 percent). The frequency and amount of overestimates of need are lower under the base year income model, about 20 percentage points and over $400 less respectively, and therefore result in a need error that is less than half the prospective model. The same is observed with understatements of need. Use of base year income

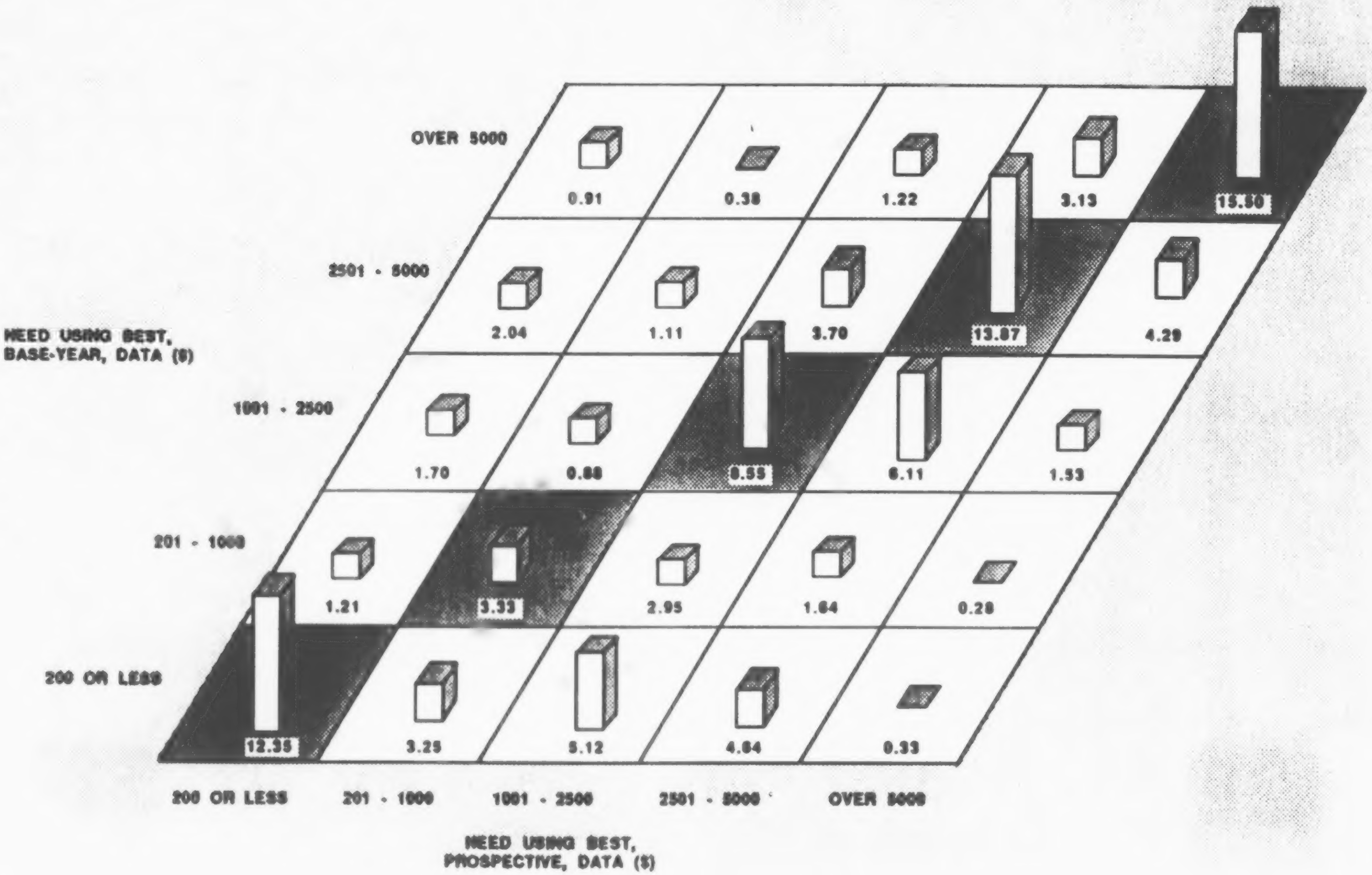

EXHIBIT 3-2. COMPARISON OF CAMPUS-BASED NEED UNDER PROSPECTIVE AND BASE-YEAR MODELS USING BEST DATA -- INDEPENDENT STUDENTS (PERCENTAGE BLOCK CHART)

TABLE 3-2

CAMPUS-BASED STUDENT NEED ERROR ATTRIBUTED TO INCOME FOR INDEPENDENT STUDENTS UNDER THE PROSPECTIVE AND BASE-YEAR MODELS, 1985-86

	NO ERROR	UNDERSTATEMENT			OVERSTATEMENT			NET NEED ERROR	
	(Within $50) Percent	Percent	Mean	Total ($ Millions)	Percent	Mean	Total ($ Millions)	Mean	Total ($ Millions)
Independent Student Income Error Under the Prospective Income Model	43.8	13.8	1,100	62.0	42.4	1,729	311.0	609	248.9
Independent Student Income Error Under the Base Year Income Model	75.3	2.9	1,598	18.8	21.9	1,369	122.3	253	103.5

results in less frequent but larger understatements of need, more than 10 percentage points less but almost $500 more on average. Base year mean net error and total net error are less than half that for the prospective model.

3.3 EFFECTS ON PELL RECIPIENTS

Reauthorization of the Higher Education Act also prescribes changes in the Pell Family Contribution Schedule. These changes will not affect as large a number of recipients as are affected by the changes to the UM. This is a function of the manner in which prospective income is used in the Family Contribution Schedule. Dependent Pell applicants supply both base year and estimates of prospective year income. If prospective income is less than 60 percent of the base year income, the processor uses the prospective income estimate to calculate the SAI. This was devised to accommodate cases in which income drops between years.

However, Table 3-3 indicates that this program feature is having completely the opposite effect. This table presents the proportion of dependent recipients for whom prospective data were actually used (reported data) and the proportion for whom it should have been used (best data). The proportions using prospective under reported and best data are virtually equal (35.6 percent and 33 percent). However, awards for about 29 percent (15.7 percent plus 13.1 percent) of the dependent recipients were calculated using the wrong data (either base year when they should have used prospective or the opposite). These data indicate

TABLE 3-3

PERCENT OF DEPENDENT PELL RECIPIENTS FOR WHOM PROSPECTIVE INCOME WAS USED, 1985-86

		USING REPORTED VALUES		
		Prospective Not Used	Prospective Used	TOTAL
USING BEST VALUES	Prospective Not Used	51.2	15.7	66.9
	Prospective Used	13.1	19.9	33.0
TOTAL		64.3	35.6	99.9

that while the program is using prospective income for approximately the correct number of dependent recipients, the 29 percent error rate suggests that they are entirely the wrong group of dependent students. This finding clearly indicates that the change in HEA was warranted.

3.3.1 Effects on Current Pell Recipients

The use of base year income for will affect 20 percent of Pell recipients, as discussed above. However, as discussed in Section 3.2, the change can result in different effects using reported and best data. Apparent effects result when analyzing the changes caused by shifting from prospective to base year for this 35 percent of the population using only reported values. True effects are uncovered by conducting this analysis using best values. Although this difference is potentially large in some analyses, the effects are small here. Exhibit 3-3 indicates that 81 percent of Title IV recipients receive the same Pell award amount (including $0). Fifteen percent become ineligible, although 45 percent of these had a positive award of less than $750. No recipients received increased awards.

Analysis of the true effects, portrayed in Exhibit 3-4, indicate only minor differences in this analysis, 82 percent receive the same award (including $0) and slightly less, 12 percent, became ineligible. A small number, just 1 percent, increase their awards.

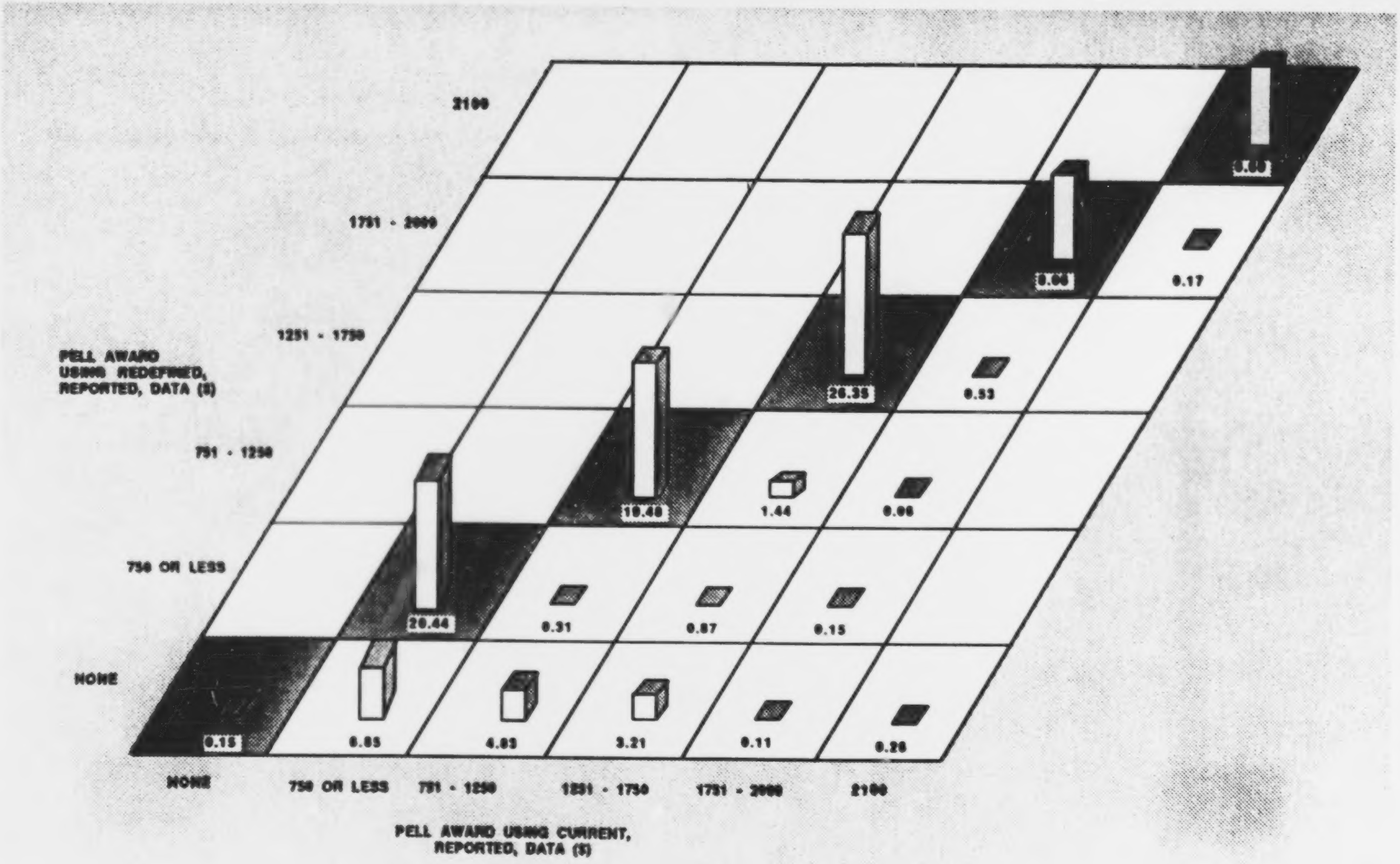

EXHIBIT 3-3. PELL AWARDS USING ALTERNATIVE DEPENDENT INCOME MODELS
FOR RECIPIENTS WITH PROSPECTIVE INCOME LESS THAN
60 PERCENT OF BASE YEAR INCOME – REPORTED DATA
(PERCENTAGE BLOCK CHART)

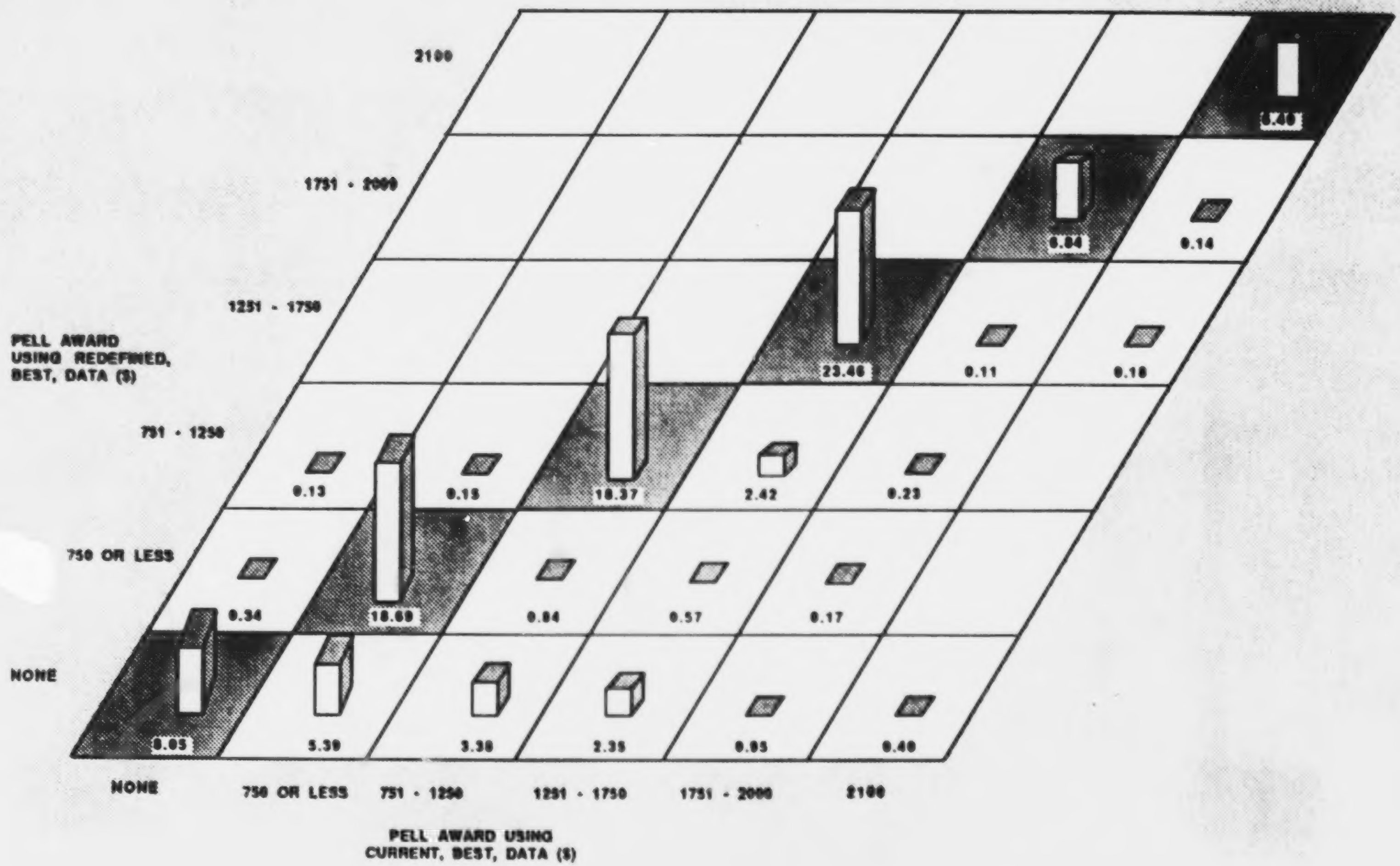

EXHIBIT 3-4. PELL AWARDS USING ALTERNATIVE DEPENDENT INCOME MODELS
FOR RECIPIENTS WITH PROSPECTIVE INCOME LESS THAN
60 PERCENT OF BASE YEAR INCOME – BEST DATA
(PERCENTAGE BLOCK CHART)

3.3.2 Effects on Error

As anticipated, the change from prospective to base year causes a precipitous decline in most measures of error. Table 3-4 indicates that Pell error drops from 16.1 to 12.2 percent and net error drops $68 million from $64.2 million to -$4.4 million. However, underawards increase from a negligible level to nearly 8 percent of cases and over $22 million. Thus, while the net error associated with dependent student income virtually would be eliminated by the change, underawards would increase slightly.

3.4 CONCLUSIONS

The analysis of altering the UM and Pell formula from using prospective to base year data result in several important conclusions. These include:

Campus-Based Programs

- All models, reported prospective, reported base year, and best base year, result in substantial differences from the best prospective distribution of need resulting from the best prospective model, although reported prospective was superior to the others.
- Replacement of reported prospective data with reported base year data results in frequent apparent changes in need, with a pronounced downward shift in need.
- Replacement of best prospective data with best base year data indicates that the true effects are greater with higher percentages of recipients changing need and a greater downward shift in need.

TABLE 3-4

PELL GRANT AWARD ERROR ATTRIBUTABLE TO DEPENDENT STUDENT INCOME ERROR UNDER THE PROSPECTIVE AND ENTIRE BASE-YEAR MODELS, 1985-86

	NO ERROR (Within $50)	UNDERAWARDS			OVERAWARDS			NET ERROR	
	Percent	Percent	Mean	Total ($ Millions)	Percent	Mean	Total ($ Millions)	Mean	Total ($ Millions)
Dependent Student Income Error Under the Prospective Income Model	83.9	0.40	400	0.8	15.7	780	65.0	120	64.2
Dependent Student Income Error Under the Base Year Income Model	87.8	7.9	531	22.2	4.4	769	17.8	-8.2	-4.4

- Quality is improved substantially under the base year model with error less than half that of the prospective model.

Pell Program

- Use of prospective income for dependent Pell recipients is error-prone and the use of base year income affects less than 20 percent of the recipients.
- The impact of the change is greatest among recipients with low awards. Nearly half of those becoming ineligible had awards of less than $750.
- Pell error attributable to dependent students' income is reduced under the base year model from 16 to 12 percent and net error drops by $68 million.

These conclusions suggest that eliminating the use of prospective income in the Uniform Methodology and Pell formula as a corrective action response will have different effects. Although quality in the Campus-Based programs will be improved substantially by using base year income, the change will cause a pronounced downward shift in need for independent students. Analyses conducted indicated no systematic, effective means of eliminating or minimizing these need changes. However, the reauthorization of the Higher Education Act allows for the fact that institutional discretion can be used to deal with large need changes.

The shift to base year income will have a less significant impact on recipients in the Pell program. In light of the substantial improvement in quality, these effects are likely to be judged acceptable by ED. In addition, reductions in Pell awards will increase need for Campus-Based and GSL aid, potentially minimizing the impact.

4.0

ANALYSIS OF REDEFINED DEPENDENCY STATUS

Beginning in the 1987-88 academic year, a redefined set of data elements and rules will be used to determine the dependency status of applicants for Title IV aid. While the reasons for the redefinition may transcend strictly quality-related issues, because dependency status errors have been high, and the change in definition is viewed as a corrective action, the probable effects, and distributional consequences, of the change should be analyzed in this report. The determination of dependency status plays a major role in the calculation of need and awards in the Title IV programs. In this chapter, we use data from the QC study to simulate the expected effects of the implementation of the redefined dependency status rules in these three areas:

- The distribution of recipients by dependency status under the current and redefined regulations
- The anticipated error rates in dependency status under the current and redefined regulations, and
- The major determinants of dependency status under the redefined regulations.

This analysis allows us to reach conclusions regarding the likely impact of the redefined regulations and to identify ways in which the rules could be modified to achieve different results. To summarize, our analysis revealed the following:

- In the aggregate, there is no change in the distribution of independents and dependents between the current and redefined dependency status regulation. An estimated 14 percent of recipients change dependency status under the redefined model, however, 7 percent going from independent to dependent and 7 percent from dependent to independent. Recipients who are 22 or 23 years old are the most likely to change dependency status under the redefined model.

- The percentage of recipients reporting as independents who should have been dependents is lower under the redefined model, but the percentage of recipients reporting as dependents who should have been independent is higher. Because the redefined model changes the incentives for students to misreport, the estimated error rate calculated under the redefined model should be treated cautiously.

- Modifying the redefined model to expand the scope of the self-sufficiency criteria greatly reduces the problem of recipients who are dependent under the current model becoming independent under the redefined model. Unfortunately, the modification also causes a number of current independents to become dependent under the redefined model.

The nature of the change in dependency status is such that it is classified as a Level II corrective action. This change affects the definition, and hence treatment, of a group of data elements, in this case, dependency status.

4.1 BACKGROUND

In 1985-86 dependency status was defined according to the responses to the following six questions:

- Did the student live with his/her parents for more than 6 weeks (42 days) in the preceding year?

- Will the student live with his/her parents for more than 6 weeks (42 days) in the coming year?

- Did the parents claim the student as a U.S. tax exemption in the preceding year?
- Will the parents claim the student as a U.S. tax exemption in the coming year?
- Did the student receive more than $750 worth of support from his/her parents in the preceding year?
- Will the student receive more than $750 worth of support from his/her parents in the coming year?

A 'yes' response to any of the six questions means that the person is treated as a dependent in applying for Title IV aid. The problems with the current definition of dependency status are fairly obvious. Three of the questions refer to activities that will not take place until the coming year. Consequently, applicants must project their circumstances for a future time period, which leads to inaccuracies. In addition, the use of projected data makes these items unverifiable at the time of application. Questions concerning living with, or receiving support from, parents may seem arbitrary and, if they involve small amounts of time or money spread throughout the year, may be difficult to reconstruct even for a prior time period.

All of the QC studies have identified dependency status as a major source of dollar error in the delivery of Federal student financial assistance. In Findings it was shown that students improperly receiving aid as independents had a significant impact on program-wide error rates in both the Pell and Campus-Based programs. Table 4-1 presents information concerning which of the six elements comprising the current dependency status definition were most likely to be misreported by

TABLE 4-1

PERCENTAGE OF INDEPENDENT TO DEPENDENT SWITCHERS WITH DISCREPANCIES IN THE ITEMS DEFINING DEPENDENCY STATUS, ALL TITLE IV PROGRAMS, 1985-86

ITEM	PERCENTAGE OF INDEPENDENT TO DEPENDENT SWITCHERS WITH DISCREPANCIES
Lived with in 1984	43.7
Lived with in 1985	52.8
Claimed in 1984	28.0
Claimed in 1985	23.6
Support in 1984	51.5
Support in 1985	49.0

recipients claiming to be independents who should have been dependents. The table contains information at the item level across all programs. Not surprisingly, the questions about living with or receiving support from parents were most often misreported. The questions asking whether the parents did or will take the student as a U.S. tax exemption are more easily answered and verifiable, and therefore were less often misreported.

In redefining dependency status, an attempt was made to avoid the pitfalls of the current definition. The questions concerning living arrangements or financial support from parents were eliminated. The data elements included in the definition were chosen in an effort to make dependency status understandable and verifiable. The objective was to make the new definition simpler and more accurate than the current one.

Under the new system, dependency status is redefined in the following manner. A student is considered independent if he/she meets any of four conditions that we call Level 1 criteria. The Level 1 criteria include the following:

- Is 24 years of age or older as of December 31 of the award year
- Veteran of the U.S. Armed Forces
- Orphan or ward of the court, or
- Having legal dependents other than a spouse.

Failing to meet any of the Level 1 criteria, a student is considered independent if he/she meets both of the Level 2 criteria as follows:

- Being married and/or a graduate student during the academic year, and
- Not expecting to have his/her parents claim them as a U.S. tax exemption in the coming year.

Unmarried undergraduate students are considered independent if they meet the Level 3 criteria which are the following:

- Parents did not claim them as U.S. tax exemptions in either of the two preceding years, and
- They received $4,000 or more in total income and benefits in both of the two preceding years. (Technical amendments to the Higher Education Act changed this criterion after we analyzed redefined dependency status. This criterion now includes student financial assistance in the $4,000 in annual total resources, but assistance from parents is not included.)

In the remainder of the chapter we analyze the likely impact of this new dependency status definition on the distribution of recipients in the Title IV programs.

4.2 METHODOLOGY

The first step in the analysis was to use the QC data base to simulate the impact of redefined dependency status with both reported and best data. There are two data elements in the redefined formula for which there were no data available in the QC data base. No data was collected in the study on circumstances occurring 2 years prior to the academic year. Consequently, we do not know if an unmarried undergraduate student was claimed by his parents as a U.S. tax exemption or received $4,000 or more in total income and benefits in the year 2 years prior to the academic year (i.e., 1983), both of which are part of redefined dependency status. The impact of the unavailability of these data elements requires classifying recipients as independent under the redefined rules when they may have been claimed as a U.S. tax exemption by their parents, or may not have received $4,000 in income and benefits in 1983. Of course, to be classified as independent, these recipients had to have not been claimed as a U.S. tax exemption by their parents and received $4,000 or more in income and benefits in the year preceding the present academic year (1984), for which data was available. Therefore, it is not unreasonable to assume that the conditions occurring in 1984 also occurred in 1983, so that the effect of the missing data elements should be minor.

As in Chapters 3 and 6 the simulations produced four models:

- Current dependency status using reported data
- Current dependency status using best data
- Redefined dependency status using reported data, and
- Redefined dependency status using best data.

We determined the distribution of independents and dependents that occurred under each of the four models. Unlike analyses in Chapters 3 and 6, however, we cannot determine awards for each of the models. The problem arises for recipients who are defined as independents using both reported and best data under the current system who become dependents under the redefined system. For these students we have no information on their parent's circumstances and so cannot compute awards for them as dependent recipients.

Instead, we had to limit the analysis to assessing changes in the distribution of dependents and independents under the four models. Because the analysis can only be conducted at the item and not the award level, it does not make sense to present the results by Title IV program. Rather, results are aggregated across programs so that a single set of results can be presented. These results are presented in the next section.

4.3 RESULTS AND CONCLUSIONS

Several different types of analyses were conducted. Comparing the distribution obtained under the redefined rules to the current distribution indicates the overall impact of the redefinition. Crossing these comparisons with relevant student characteristics indicates the impact of the redefinition on subpopulations of interest. Contrasting reported to best data for both the current and redefined models produces error rates under each system. Comparing error rates across the two systems indicates the extent to which validity is affected by the redefinition of dependency status. Finally, measuring the impact of the specific data elements comprising the redefined rules on the determination of dependency status allows us to identify ways that the redefined rules could be changed to achieve different results.

4.3.1 Impact of the Redefinition of Dependency Status

In order to assess the impact of the new definition along several dimensions, we make four comparisons of the models and then supplement these comparisons by looking at subpopulations of recipients. The four basic comparisons we examine are the current model using reported data vs. the redefined model with reported data, the current model with reported data vs. the redefined model with best data, the current model with best data vs. the redefined model with reported data, and finally the current model with best data vs. the redefined model with best data. These comparisons are discussed in the following paragraphs.

Table 4-2 presents the distribution of dependents and independents under the current and redefined system using both reported and best data. Comparing the current reported model with the redefined reported model simulates the expected redistribution that will occur when the redefined rules are implemented. The total percentage of independents (41.9) and dependents (58.1) remains constant under the redefined reported model. This does not mean that the redefinition does not have an impact. An estimated 14 percent of recipients change dependency status under the redefined system, 7 percent going from independent to dependent and 7 percent from dependent to independent. While these changes counteract each other in the aggregate, their magnitude indicates that on an individual basis there is a great deal of shifting of dependency status under the redefined model.

TABLE 4-2

IMPACT OF REDEFINED DEPENDENCY STATUS, ALL TITLE IV PROGRAMS, 1985-86

		REDEFINED			
		Reported		Best	
CURRENT		Independent	Dependent	Independent	Dependent
Reported	Independent	34.9	7.0	35.4	6.5
	Dependent	7.0	51.1	7.7	50.4
Best	Independent	33.7	6.3	34.5	5.4
	Dependent	8.3	51.8	8.6	51.5

One goal of the redefinition of dependency status was to incorporate data elements that could be verified more easily. If verifying component data elements became part of the implementation of the redefined dependency status model, then using best rather than reported data might better simulate the expected impact of the redefined model. Comparing the current reported model to the redefined best model reveals similar results as the comparison to the redefined reported model. Using best data, the percentage of recipients going from independent under the current model to dependent under the redefined model (6.5 percent) declines slightly while the percentage going from dependent to independent (7.7 percent) increases slightly, compared to the results obtained using reported data.

In Chapters 3 and 6, comparisons of the redefined reported model with the current best model are used to assess the equity of the new definition. This assumes that the current best model is the optimal one and that the redefinition is only attempting to get closer to the optimal than the current reported model by removing the error inherent in the current model. In the case of dependency status, the assumption that the current best model is optimal may not be entirely valid. Quality issues certainly were a major impetus for the redefinition. However, there was also a feeling that the current definition did not adequately capture the phenomenon of dependence and so needed to be redefined. The extent to which the redefinition was predicated on conceptual factors, rather than quality related factors, determines the validity of comparisons to the current best model as optimal.

The data in the table reveal that the redefined models do not approach the current best model. Using reported data, 14.6 percent of recipients change status from the current best model to the redefined model, with 8.3 percent going from dependent to independent and 6.3 percent going from dependent to independent. Using best data the results do not change significantly. The redefined best model differs from the current best model in 14 percent of cases, with 5.4 percent going from independent to dependent and 8.6 percent dependent to independent.

Under both redefined models, the impact of the change compared to the current best model is far greater than the dependency status error rates occurring under the current model in Findings. The importance of this result depends on whether the redefinition was solely intended to remove the error inherent in the current model or was based on a different philosophy of dependence. If quality issues predominated, then the redefined model does not appear to be successful given its large deviation (percentage of switchers) from the current model under ideal circumstances (i.e., using best data).

Exhibit 4-1 demonstrates the impact of redefined dependency status, using reported data, according to the student's age. The vast majority (92.4 percent) of recipients 18 or under are dependent under both models. Of the 6.3 percent that are independent under the current model, two-thirds become dependent under the redefined model. Similar results hold for recipients between 19 and 21, with 82 percent remaining dependent, but almost half of those independent under the current model

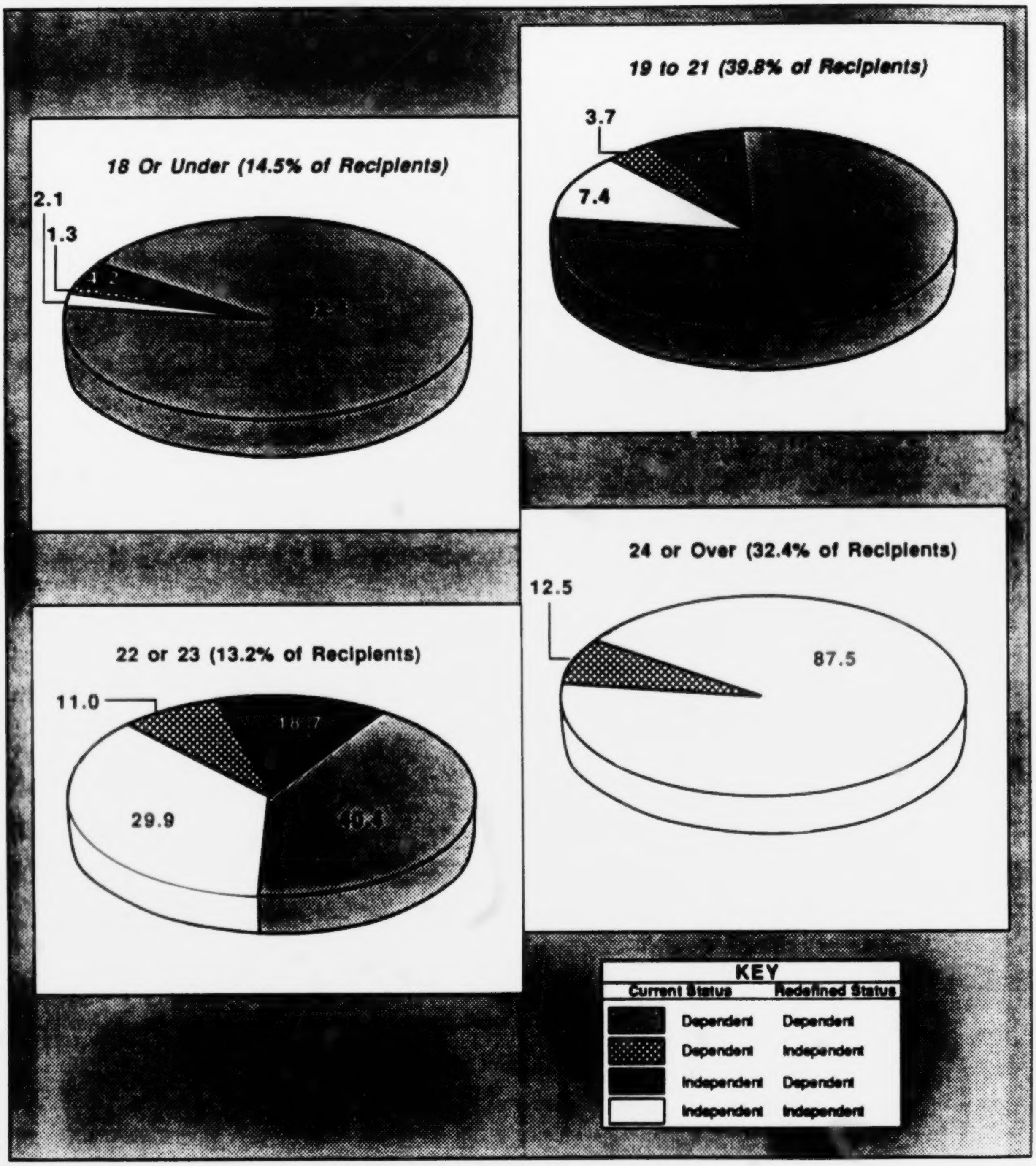

EXHIBIT 4-1. IMPACT OF REDEFINED DEPENDENCY STATUS BY STUDENT'S AGE

becoming dependent. Recipients who are 22 or 23 are the most likely to switch dependency status with 11 percent going from dependent to independent and 18.7 percent going from independent to dependent. By definition, all recipients 24 or older are independent under the redefined model. However, 12.5 percent of these recipients are dependent under the current model.

4.3.2 Comparison of Error Rates Under the Two Models

As stated above, a major impetus for redefining dependency status was the misreporting problem occurring under the current definition. To assess whether the redefined model is likely to improve validity we compared the error rate found under the current model to the error rate expected under the redefined model. The results of this comparison are presented in Table 4-3.

The table indicates that under the redefined model the rate at which recipients report being independent, when in fact they should be classified as dependent, is reduced by one-half. The implementation of the redefined model, therefore, should significantly reduce the problem of independent to dependent switchers identified in this and previous QC studies. As shown in Findings, the impact on award error of switching from independent to dependent status is much greater than switching from dependent to independent. Under the redefined model the percentage of recipients who report being dependent who should be classified as independent increases substantially.

TABLE 4-3

COMPARISON OF ERROR RATES BETWEEN THE CURRRENT AND REDEFINED DEPENDENCY STATUS MODELS, ALL TITLE IV PROGRAMS, 1985-86

ERROR RATE UNDER CURRENT DEFINITION

		BEST		
		Independent	Dependent	Total
Reported	Independent	39.3	2.6	41.9
	Dependent	0.6	57.5	58.1
	Total	39.9	60.1	100.0

ERROR RATE UNDER REDEFINED DEFINITION

		BEST		
		Independent	Dependent	Total
Reported	Independent	40.6	1.3	41.9
	Dependent	2.5	55.6	58.1
	Total	43.1	56.9	100.0

Even given the diminished impact on award error, the increase in the rate of dependent to independent switchers under the redefined model is troubling. The reason for this increase probably has to do with the misreporting of student's income and benefits since there was little or no misreporting identified in any of the other elements that comprise dependency status under the redefined model. Unmarried undergraduates may underreport their own income and benefits so that, using reported data, they fell below the $4,000 limit and are considered dependent under the redefined model. Substituting best values, the amount of income and benefits received by these unmarried undergraduates may be revealed to be $4,000 or greater causing them to be classified as independent under the refined model.

The above explanation assumes that the incentives for misreporting remain the same under the current and redefined models. In Findings, it was demonstrated that the majority of recipients misreporting, do so in a manner that increases their award. Under the current system, there are incentives for recipients to underreport their own income and benefits because SAI and need are inversely related to income. Under the redefined model, the incentives for misreporting student's income are altered. Reporting an income of $4,000 or more may prove beneficial if the associated increase in the student's contribution is more than offset by the savings associated with being treated as an independent.

Given the relationship between misreporting and the peculiarities of the formula being used to determine benefits, it is difficult to estimate an error rate for the redefined dependency status model. In the analysis of error rates presented in Chapters 3 and 6, the incentives for misreporting remain the same under the current and redefined models. Therefore, it is appropriate to assume that the nature of misreporting also remains the same under the redefined model. Since the incentives for misreporting change with the redefined dependency status model, it may no longer be appropriate to assume that the nature of misreporting found under the current model also pertains under the redefined model.

4.3.3 Analysis of the Determinants of Redefined Dependency Status

As discussed in Section 4.3.1, determining whether the redefinition of dependency status is an effective strategy depends on what the objectives for changing the definition are. Given the problems under the current system of students receiving aid as independents who should be dependents, one reasonable objective of the redefined model might be to ensure that these independents are classified as dependents while minimizing the number of previously defined dependents becoming independents. The data presented previously indicate that if this is the objective of the redefined model, it has to be considered unsuccessful. The number of dependents under the current model that become independents under the redefined model is equal to those changing from independents to dependents. The question then becomes: Can the redefined model be altered so that recipients classified as dependent under the current model do not become independent under the redefined model? In the remainder of this section we address this question by looking at the determinants of dependency status using the redefined model.

The redefined regulations for determining dependency status can be thought of as having three hierarchical levels. Meeting the conditions for being independent at any level in the hierarchy results in the applicant being treated as an independent in the determination of need and/or awards in the Title IV programs. The determinants of independent status at each level are listed on Table 4-4.

Because the levels are hierarchical in nature, recipients meeting the criteria for independent status at a higher level do not also need to meet them at the lower levels. For example, any recipient 24 or older has no other conditions for being considered independent. To understand the critical determinants of dependency status under the redefined model, it is instructive to analyze the levels as concurrent rather than hierarchical. In Table 4-4 the percentage of cases classified as independent under the redefined model meeting the criteria at each level is presented regardless of whether they met the criteria at a higher level. Married or graduate students are also checked against the unmarried undergraduate criteria which is an indication of self-sufficiency. Table 4-4 presents the breakdown by level depending on whether the recipient is independent or dependent under the current definition of dependency status.

TABLE 4-4

DETERMINANTS OF INDEPENDENT STATUS UNDER THE REDEFINED DEFINITION, 1985-86

	CURRENT STATUS	
	Independent	Dependent
Level 1*	86.2	66.8
Level 1 only	21.6	65.1
Levels 1 and 2	11.7	12.1
Levels 1 and 3	31.0	21.5
Levels 1,2, and 3	35.7	1.3
	100.0	100.0
Level 2*	45.6	16.7
Level 2 only	4.5	46.1
Levels 1 and 2	22.1	48.4
Levels 2 and 3	5.8	0.0
Levels 1,2, and 3	67.6	5.5
	100.0	100.0
Level 3*	69.2	40.8
Level 3 only	13.1	62.7
Levels 1 and 3	38.6	35.1
Levels 2 and 3	3.8	0.0
Levels 1,2, and 3	44.5	2.2
	100.0	100.0

* Level 1:

Is 24 years of age or older as of December 31 of the award year,
Veteran of the U.S. Armed Forces,
Orphan or ward of the court, or
Having legal dependents other than a spouse.

* Level 2: Married or graduate students

Not expecting to have their parents claim them as a U.S. tax exemption in the coming year.

* Level 3: Unmarried undergraduates

Parents did not claim them as U.S. tax exemptions in either of the two preceding years, and
They received $4,000 or more in total income and benefits in both of the two preceding years.

For example: 86.2 percent of the independent students under the current definition met the Level 1 criteria under the new definition. Of these, 21.6 met only Level 1, 11.7 Levels 1 and 2, 31.0 Levels 1 and 3, and 35.7 met Levels 1, 2, and 3.

For both groups, the Level 1 criteria is the one most often met. The majority of recipients qualifying as independent at Level 1 did so based on being 24 or older. Recipients who are independent under the current definition are more likely to meet the criteria at each level than those who are currently dependent. In addition, there is much less overlap among levels for current dependents. For example, 65.1 percent of current dependents only met the Level 1 criteria compared to 21.6 percent of current independents.

The results indicate that a large number of recipients classified as independent under the redefined model do not meet the Level 3 self-sufficiency criteria (not claimed as a U.S. tax exemption by their parents and receiving $4,000 or more in income and benefits in the preceding 2 years). This is particularly true of current dependents, where almost 60 percent fail to meet the Level 3 criteria. Imposing the Level 3 self-sufficiency requirements on all students, regardless of whether they qualify at a higher level, should therefore help eliminate much (60 percent) of the problem with recipients going from dependent under the current model to independent under the redefined model. Imposition of the Level 3 criteria on all students also causes a significant (30 percent) number of independents under the current model to become dependent.

If economic self-sufficiency is to be the critical criterion for independent status, then students, regardless of age, should be able to demonstrate how they support themselves or be considered dependent on parental support. Therefore, we recommend that one criterion for independent status be the student's ability to demonstrate self-sufficiency.

5.0

INSTITUTIONAL QUALITY CONTROL PROCEDURES AND VALIDATION[1]

This chapter presents our analyses of institutional quality control procedures and validation. The analyses presented in this chapter build upon those presented in Findings, where preliminary analyses suggested that institutional quality control procedures and validation were associated with lower rates of institutional and student error, respectively, in the Title IV programs. This chapter will further analyze quality control procedures and validation to determine the extent to which each is related to student and institutional error, when controlling for other factors that may have influenced the results presented in Findings.

Restructuring validation and implementing or focusing corrective actions on an institutional quality control approach are Level III corrective actions. These types of corrective actions are designed to address residual error after Level I and II corrective actions. By changing or restructuring validation procedures or focusing on institutional quality control ED is seeking to remove any disparity between lines of authority, control, and methods of accountability.

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[1] Throughout this chapter we use the term "validation" to refer to activities in the Pell program that are associated with confirming the value of student-supplied data. In addition, we also use the term to refer to optional activities of institutions to verify the data outside the scope of the Pell Grant program. We use the term validation to avoid confusion since the activities included in this chapter occurred in the 1985-86 academic year, prior to recent regulations that formulated an integrated system.

The results in this chapter are different from those in Findings and could produce different outcomes because the analyses in this chapter control for effects among the variables while the analyses in Findings did not. Variables that appeared significant in the analyses in Findings may not be significant in these analyses.

In order to control for these other factors, the analyses in this chapter use multivariate models involving regression equations. In general using regression analysis allows one to isolate the effects of a given factor or variable on an outcome measure (i.e., the dependent variable) when controlling for various other independent variables. In the analyses in this chapter, the independent variables in each model are tested for their relationship with the existence of error. Testing variables in regression models allows us to estimate the association between each of the independent variables and the likelihood of error. The analyses we performed for this report indicate the following:

Institutional Quality Control Procedures

- For the most part, the analyses conducted in this report confirm those that we presented in Findings. Institutional quality control procedures were generally associated with lower rates of institutional error in the Pell and Campus-Based programs. In many cases, however, the lower rates of error were not statistically significant at the 10, 5, or 1 percent level.

- Sampling-based QC procedures continued to be associated with lower rates of error more often than other QC procedures. The QC category other/sampling was significant at the 5 percent level in four of the five models, while the category automated/sample was significant at the 1 percent level in two of the five models.

- Higher levels of either professional or clerical/data entry staff and higher levels of automation were, for the most part, not significantly associated with lower rates of institutional error. However, these variables could be related to the number of recipients, or other variables, which were significantly associated with lower error rates.

- These findings support continued development of the Institutional Quality Control Pilot Project and similar activities. In addition to the Pilot, materials and information concerning quality control procedures could be developed as technical assistance materials for institutions not participating in the pilot.

Validation

- Confirming the analyses in Findings, the analyses in this chapter show that Pell validated cases have a higher probability of having a student error removed than not validated cases.

- Institutional validated cases also have a higher probability of having errors removed than not validated cases. This difference, however, is not significant.

- Validation-related procedures that could be used in designing corrective actions were not significant in explaining differences in error removed through validation.

5.1 INSTITUTIONAL QUALITY CONTROL PROCEDURES

Initial analyses performed in Findings pointed to the fact that students attending institutions that employed quality control procedures had lower rates of institutional error in the Pell and Campus-Based programs than students attending institutions that did not employ quality control procedures. In addition, the Findings results suggested that certain QC procedures worked better than others. However, the Findings analyses did not control for any other variables that might have been related to an institution's use of quality control procedures.

The following sections of this chapter will present the outcome of further examination of institutional quality control procedures. We have conducted our analyses to control for other institutional characteristics. This allows us to determine the association between institutional quality control procedures and institutional error rates more accurately than if we did not control for other characteristics. When presenting our analyses we continue to use the categories we used in Findings to classify institutions according to the types of QC procedures they employed. A complete description of these categories can be found in Chapter 7 (Section 7.2.1) of Findings.

5.1.1 Summary from Findings

As mentioned above, in the Findings report we found that students attending institutions that had a set of quality control procedures in place had lower rates of institutional error than students attending institutions with little or no quality control procedures. The Findings analyses found this relationship to be present in the Pell and Campus-Based programs. By contrast, quality control procedures were not associated with lower rates of institutional error in the GSL program. Table 5-1 summarizes the Findings results for both the Pell and Campus-Based programs.

TABLE 5-1

SUMMARY OF FINDINGS RESULTS FOR QUALITY CONTROL PROCEDURES, 1985-86

QC CATEGORY	INSTITUTIONAL PELL ERROR RATE (%)			INSTITUTIONAL CAMPUS-BASED NEED ERROR RATE (%)		
	No Error (Within $50)	Underaward	Overaward	No Error (Within $50)	Understatements	Overstatements
Little or No Quality Control	61.5	12.5	26.0	53.2	20.4	26.3
Mixed	66.1	11.7	22.2	73.5	14.8	11.7
Automated	68.4	8.6	23.1	61.9	20.4	17.7
Sample	70.2	14.4	15.5	67.8	12.0	11.7
Automated/Sample	76.8	8.0	15.2	76.3	14.4	17.9
Manual/Other	62.6	16.2	21.2	61.6	15.4	23.0
Manual or Other/Sample	81.8	10.4	7.8	73.4	8.7	17.9

Pell Grant Program

Students attending institutions that made use of institutional quality control procedures had lower rates of institutional error. In particular, the analysis pointed to the fact that certain types of quality control procedures might be associated with lower levels of institutional error than other types of quality control procedures. The analysis in Findings suggested that sampling was associated with the lowest rates of institutional error particularly when sampling was used in conjunction with other quality control procedures (e.g., automated quality control checks, manual quality control checks, or other auxiliary quality control procedures). Students attending institutions using sampling and either manual quality control checks or auxiliary quality control procedures (e.g., using auditors, using consultants, checking other offices, or interviewing students) had institutional Pell error 19.2 percent of the time, students attending institutions using sampling in conjunction with automated quality control checks had institutional Pell errors 23.2 percent of the time, and 29.8 percent of the recipients attending institutions using only sampling had institutional Pell errors. In contrast, 38.5 percent of recipients attending institutions with little or no quality control had institutional Pell errors.

Campus-Based Programs

The analyses in Findings concerning the association of institutional Campus-Based errors with quality control procedures found results similar to those in the Pell program. Students attending institutions using sampling in conjunction with other quality control procedures, as well as students attending institutions using a mixture of quality control procedures had lower rates of institutional error. Students at schools using sampling in conjunction with automated quality control checks had institutional Campus-Based need errors 23.7 percent of the time, students attending institutions using sampling in conjunction with either manual quality control checks or other auxiliary quality control procedures had institutional errors 26.6 percent of the time, while 26.5 percent of the recipients attending institutions using a mixture of quality control procedures (with no individual type of procedure predominating) had institutional Campus-Based need errors. Students attending institutions with little or no quality control had institutional errors 46.8 percent of the time.

5.1.2 Methodology and Analytic Approach

While the differences we identified in Findings for Pell and Campus-Based were statistically significant, the analysis could not determine if the differences in error rates occurred due to QC procedures or due to other related institutional characteristics. Because it is possible that schools employing sampling or other QC procedures tend to have other common characteristics (e.g., type and control, number of recipients), the lower error rate could have been the result of these characteristics. Therefore, the Findings analyses may have masked the effects of other characteristics. For this reason the analyses presented in this report have been structured to indicate more effectively the association of QC procedures and institutional Pell error.

To identify the critical determinants of error, we must estimate the relationship between the individual explanatory factors and the existence of error. In order to accomplish this, the impact of a given explanatory factor must be estimated, controlling for the effects of other relevant factors. In particular, we want to estimate the impact of quality control procedures on the likelihood of error, while controlling for other institutional characteristics. Because it is necessary to control for other factors, we needed to use multivariate techniques to estimate the models. The bivariate analyses presented in Findings, while not appropriate for estimating the models, were useful in helping to specify the multivariate models that we tested.

Regression analysis is generally considered one of the best statistical techniques for hypothesis testing in a multivariate framework. Therefore, it is appropriate where we have prior hypotheses concerning the relationship between the dependent and independent variables. As stated before, the outcome measure used in the equations was the probability of an error occurring. The dependent variable is, therefore, dichotomous, with a one coded if an error of over $50 was present and a zero otherwise. The use of a continuous dependent variable, (i.e., the level of error) is not proper in this situation because the large number of cases without error would tend to distort the regression results. Also, the level of error is not of particular interest since it depends on characteristics such as unmet need that are beyond the control of the institution.

The Ordinary Least Squares (OLS) regression procedure contains several estimation problems when the dependent variable is dichotomous. These problems include a heteroskedastic error term and the possibility of predicting probabilities of over 100 percent or probabilities which are negative. Therefore, in order to estimate the models with a dichotomous dependent variable we used the logistic multiple regression procedure, which overcomes the problems associated with the OLS procedure, relating the occurrence of errors as dependent variables to the explanatory variables.

With a larger sample size it would have been possible to estimate models for each of the critical errors identified in Findings. Unfortunately, for many of these errors there were not sufficient numbers of cases with error to permit estimation. For example, overall institutional error could not be broken into its component parts because errors in these components occurred too infrequently. The need to use more aggregated error measures as dependent variables may mean that explanatory factors which were only related to certain specific errors may not have been uncovered and identified as critical determinants of error. In addition, it means that no statements regarding the determinants of error could be made for several of the more specific errors many of which were discussed in Chapter 2.

The following is a list of dependent variables for which we estimated models:

- **Pell:**
  - **Institutional overawards**
  - **Institutional underawards**
- **Campus-Based:**
  - Institutional overstatements of need
  - Institutional understatements of need
  - Institutional payment error (awards in excess of need)

For each of the models we used the same independent or explanatory variables. These independent variables included those that imply an approach to quality control and can be varied (e.g., types of QC procedures used, use of automation, number of staff FTE's) as well as variables that are control variables and cannot be altered (e.g., type and control of institution, number of recipients). This distinction is important to make since independent variables that can be altered have particular relevance for corrective actions. The explanatory variables we used in the five models were the following:

- Institution type and control
- Academic calendar
- Level of automation
- Number of clerical or data entry staff FTE's
- Number of professional staff FTE's
- Number of program recipients, and
- Type of QC procedures used.

We used these explanatory variables to estimate the effects on the likelihood of an institutional error. Because QC procedures, level of automation, and number of clerical/data entry and professional staff

FTE's were associated with lower rates of institutional error in Findings, we hypothesized that they would continue to be associated in the multivariate models. Cases that had errors of $50 or less were treated as if they were not in error.

5.1.3 Results and Conclusions

Tables 5-2 through 5-6 (starting on page 5-15) present the results of the logistic regression models discussed in the previous section. These tables show each of the explanatory variables, their observed relationship or effect on the likelihood of an error, and the level of significance of the variable. Because six of the seven explanatory variables were discrete, it was necessary to omit one value for each of these variables from the regression. It is these omitted characteristics that comprise the intercept of the regression against which all of the other values of the variables are then compared. Thus, in Tables 5-2 through 5-6, the effect of alternative values of the discrete variables on the likelihood of error are stated relative to the omitted values. The significance levels of the estimated relationships are stated at levels of 1, 5, and 10 percent, or as not significant. These values state the probability that the observed relationships of the explanatory variables and the likelihood of error could occur if in fact there is no relationship at all. (For example, Table 5-2 shows that students at 4-year private institutions were less likely to have an institutional Pell overpayment than students at 2-year institutions when controlling for the other factors in the model. There is a 1 percent chance that this difference might not exist for the population, even though we estimated the relationship from the sample.)

We must state our findings in terms of a level of significance because the sample will not be exactly representative of the population. We have stated our findings in significance levels of 1, 5, and 10 percent as these are standard values of accepted levels of significance for social scientific studies. Beta coefficients are not presented because in logistic regression they represent the change in the logarithm of the probability of error associated with a one unit change in the independent variable and, hence, are not meaningful by themselves.

As a further means of explaining the findings of the regression models given the lack of meaningful coefficients, we developed six different profiles of institutions and presented the expected probability of error for each of the models for the six profiles. These profiles were designed to be descriptive of certain types of institutions. The institutional error rates presented for the profiles were calculated from the regression results and not observed. Using a standard formula, we translated the regression coefficients into probabilities of error and thus the effect of each variable is determined controlling for all other variables rather than jointly. Therefore, the imputed error rates should not be interpreted as what we would observe, but rather as estimates based on the relationships among the variables we examined.

The profiles we developed for explaining the regression results are the following:

- Profile 1 - 4-year private institution, semester-based academic calendar, high level of automation, moderate number of program recipients, 5 or more professional staff FTE's, 4 or more clerical or data entry staff FTE's, use of sampling procedures in conjunction with either manual QC checks or other auxiliary QC procedures. (We will refer to schools meeting Profile 1 criteria as "high automation, manual or other/sampling QC" schools.)

- Profile 2 - 4-year public institution, semester-based academic calendar, high level of automation, large number of program recipients, 5 or more professional staff FTE's, 4 or more clerical or data entry staff FTE's, use of sampling in conjunction with automated QC checks. (We will refer to Profile 2 schools are "high automation, sampling/automated QC".)

- Profile 3 - 4-year private institution, non semester-based academic calendar, low level of automation, small number of program recipients, less than 5 professional staff FTE's, less than 4 clerical or data entry staff FTE's, little or no use of QC procedures. (Profile 3 schools will be called "low automation, little or no QC".)

- Profile 4 - 4-year institution (private or public), non semester-based academic calendar, low level of automation, less than 5 professional staff FTE's, less than 4 clerical or data entry staff FTE's, low number or program recipients, use of either manual QC checks or other auxiliary QC procedures. (We will refer to Profile 4 schools as "low automation, manual/other QC" schools.)

- Profile 5 - proprietary institution, non semester-based academic calendar, high level of automation, less than 5 professional staff FTE's, less than 4 clerical or data entry staff FTE's, moderate number of recipients, use of a mixture of QC procedures. (Profile 5 schools will be called "high automation, mixed QC".)

- Profile 6 - 2-year institution, semester-based academic calendar, high level of automation, large number of recipients, 5 or more professional staff FTE's, 4 or more clerical or data entry staff FTE's, use of automated QC checks. (Profile 6 schools will be called "high automation, automated QC".)

While these profiles are mutually exclusive, they are not totally exhaustive. The profiles are presented to describe some typical institutions and do not display all institutions included in the study.

Pell Logistic Regression Models

As shown in Table 5-2, a number of the explanatory variables (e.g., staff FTE's, automation) that were significantly related to decreased error rates in the Findings analyses are not significant in the multivariate analyses. These differences occurred because the analyses contained in this report control for other variables while the analyses in Findings did not. All QC categories had lower rates of error than little or no QC, yet only the mixed, sampling, and other/sampling categories are significant. High levels of automation actually increased the probability of an institutional Pell overpayment relative to low levels of automation although the difference is not significant.

For institutional Pell underpayments, Table 5-3 shows that no QC category is significantly different than little or no QC procedures in their association with the likelihood of an institutional Pell underaward. All QC categories except for sampling, while not significant, did show decreases in the probability of error. Contrary to what we hypothesized, a high level of automation is significantly associated with the increased probability of institutional Pell underpayments compared to a low level of automation.

TABLE 5-2

LOGISTIC REGRESSION ESTIMATES OF PROBABILITY OF PELL OVERPAYMENTS, 1985-86

SOURCE	EFFECT ON PROBABILITY OF ERROR	SIGNIFICANCE LEVEL
* 2-Year (Private and Public)	N/A	N/A
4-Year Private	Decrease	1 percent
4-Year Public	Decrease	5 percent
Proprietary	Decrease	5 percent
* Non-Semester	N/A	N/A
Semester	Decrease	1 percent
* Low Level of Automation	N/A	N/A
High Level of Automation	Increase	Not significant
* Less Than 5 Professional Staff FTE's	N/A	N/A
5 or More Professional Staff FTE's	Increase	Not significant
* Less Than 4 Clerical or Data Entry Staff FTE's	N/A	N/A
4 or More Clerical or Data Entry Staff FTE's	Increase	Not significant
Number of Pell Recipients	Decrease	Not significant
* Little or No QC	N/A	N/A
Mixed QC Procedures	Decrease	10 percent
Automated QC Procedures	Decrease	Not significant
Sampling QC Procedures	Decrease	1 percent
Automated/Sampling QC Procedures	Decrease	Not significant
Manual/Other QC Procedures	Decrease	Not significant
Other/Sampling QC Procedures	Decrease	1 percent

*N/A indicates that these characteristics were omitted from the regression and are captured in the intercept.

TABLE 5-3
LOGISTIC REGRESSION ESTIMATES OF PROBABILITY OF PELL UNDERPAYMENTS, 1985-86

SOURCE	EFFECT ON PROBABILITY OF ERROR	SIGNIFICANCE LEVEL
* 2-Year (Private and Public)	N/A	N/A
4-Year Private	Decrease	1 percent
4-Year Public	Decrease	1 percent
Proprietary	Decrease	1 percent
* Non-Semester	N/A	N/A
Semester	Decrease	1 percent
* Low Level of Automation	N/A	N/A
High Level of Automation	Increase	1 percent
* Less Than 5 Professional Staff FTE's	N/A	N/A
5 or More Professional Staff FTE's	Increase	Not significant
* Less Than 4 Clerical or Data Entry Staff FTE's	N/A	N/A
4 or More Clerical or Data Entry Staff FTE's	Increase	1 percent
Number of Pell Recipients	Decrease	1 percent
* Little or No QC	N/A	N/A
Mixed QC Procedures	Decrease	Not significant
Automated QC Procedures	Decrease	Not significant
Sampling QC Procedures	Increase	Not significant
Automated/Sampling QC Procedures	Decrease	Not significant
Manual/Other QC Procedures	Decrease	Not significant
Other/Sampling QC Procedures	Decrease	Not significant

*N/A indicates that these characteristics were omitted from the regression and are captured in the intercept.

Campus-Based Logistic Regression Models

As shown in Table 5-4, all QC categories are associated with lower rates of institutional Campus-Based overstatements of need relative to little or no QC procedures. In addition, all but one of these categories (manual/other QC procedures) is significant at the 5 percent level. As was the case with the Pell models, a high level of automation was associated with an increased rate of error relative to a low level of automation, yet the difference is not statistically significant.

Table 5-5 presents the regression results for institutional Campus-Based understatements of need. This table shows, again, that all QC categories are associated with a decrease in the rate of error relative to little or no QC procedures. However, only the categories sampling, other/sampling, and manual/other are significant at the 10 percent level. In addition, the number of professional staff FTE's is significantly associated with institutional Campus-Based understatements. Five or more professional staff FTE's is associated with an increase in the probability of an institutional Campus-Based understatement relative to institutions with fewer than five professional staff FTE's.

The regression results presented in Table 5-6 are those for institutional Campus-Based payment error. These results show that all QC categories are associated with lower rates of institutional Campus-Based payment error relative to the use of little or no QC procedures. The QC categories automated/sampling, other/sampling, mixed, and automated are

TABLE 5-4

LOGISTIC REGRESSION ESTIMATES OF PROBABILITY OF CAMPUS-BASED OVERSTATEMENTS OF NEED, 1985-86

SOURCE	EFFECT ON PROBABILITY OF ERROR	SIGNIFICANCE LEVEL
* 2-Year (Private and Public)	N/A	N/A
4-Year Private	Decrease	Not significant
4-Year Public	Increase	Not significant
Proprietary	Decrease	Not significant
* Non-Semester	N/A	N/A
Semester	Decrease	Not significant
* Low Level of Automation	N/A	N/A
High Level of Automation	Increase	Not significant
* Less Than 5 Professional Staff FTE's	N/A	N/A
5 or More Professional Staff FTE's	Increase	Not significant
* Less Than 4 Clerical or Data Entry Staff FTE's	N/A	N/A
4 or More Clerical or Data Entry Staff FTE's	Increase	Not significant
Number of Campus-Based Recipients	Decrease	Not significant
* Little or No QC	N/A	N/A
Mixed QC Procedures	Decrease	1 percent
Automated QC Procedures	Decrease	5 percent
Sampling QC Procedures	Decrease	5 percent
Automated/Sampling QC Procedures	Decrease	1 percent
Manual/Other QC Procedures	Decrease	Not significant
Other/Sampling QC Procedures	Decrease	5 percent

*N/A indicates that these characteristics were omitted from the regression and are captured in the intercept.

TABLE 5-5

LOGISTIC REGRESSION ESTIMATES OF PROBABILITY OF CAMPUS-BASED UNDERSTATEMENTS OF NEED, 1985-86

SOURCE	EFFECT ON PROBABILITY OF ERROR	SIGNIFICANCE LEVEL
* 2-Year (Private and Public)	N/A	NA
4-Year Private	Decrease	1 percent
4-Year Public	Decrease	Not significant
Proprietary	Decrease	Not significant
* Non-Semester	N/A	NA
Semester	Decrease	1 percent
* Low Level of Automation	N/A	NA
High Level of Automation	Increase	Not significant
* Less Than 5 Professional Staff FTE's	N/A	NA
5 or More Professional Staff FTE's	Increase	5 percent
* Less Than 4 Clerical or Data Entry Staff FTE's	N/A	NA
4 or More Clerical or Data Entry Staff FTE's	Increase	Not significant
Number of Campus-Based Recipients	Decrease	1 percent
* Little or No QC	N/A	NA
Mixed QC Procedures	Decrease	Not significant
Automated AC Procedures	Decrease	Not significant
Sampling QC Procedures	Decrease	5 percent
Automated/Sampling QC Procedures	Decrease	Not significant
Manual/Other QC Procedures	Decrease	10 percent
Other/Sampling QC Procedures	Decrease	1 percent

*N/A indicates that these characteristics were omitted from the regression and are captured in the intercept.

TABLE 5-6

LOGISTIC REGRESSION ESTIMATES OF PROBABILITY OF CAMPUS-BASED PAYMENT ERROR (AWARDS IN EXCESS OF NEED), 1985-86

	SOURCE	EFFECT ON PROBABILITY OF ERROR	SIGNIFICANCE LEVEL
*	2-Year (Private and Public)	N/A	NA
	4-Year Private	Increase	Not significant
	4-Year Public	Increase	Not significant
	Proprietary	Increase	Not significant
*	Non-Semester	N/A	NA
	Semester	Increase	Not significant
*	Low Level of Automation	N/A	NA
	High Level of Automation	Decrease	Not significant
*	Less Than 5 Professional Staff FTE's	N/A	NA
	5 or More Professional Staff FTE's	Increase	Not significant
*	Less Than 4 Clerical or Data Entry Staff FTE's	N/A	NA
	4 or More Clerical or Data Entry Staff FTE's	Decrease	Not significant
	Number of Campus-Based Recipients	Decrease	Not significant
*	Little or No QC	N/A	NA
	Mixed QC Procedures	Decrease	5 percent
	Automated QC Procedures	Decrease	10 percent
	Sampling QC Procedures	Decrease	Not significant
	Automated/Sampling QC Procedures	Decrease	1 percent
	Manual/Other QC Procedures	Decrease	Not significant
	Other/Sampling QC Procedures	Decrease	5 percent

*N/A indicates that these characteristics were omitted from the regression and are captured in the intercept.

all significant at the 10 percent level. No other explanatory variables are significant, yet in this regression a high level of automation is associated with a lower rate of institutional Campus-Based payment error compared to a low level of automation.

The institutional error rates in each respective error category of the institution profiles we developed are presented in Table 5-7 and summarized in Exhibit 5-1. No strict pattern exists across the profiles and there are wide variations within the error measures across the profiles. However, Profile 1 (high automation, manual or other/sampling QC) tends to have lower rates of error while Profiles 3 (low automation, little or no QC), 4 (low automation, manual/other QC), and 6 (high automation, automated QC) tend to have higher rates of error.

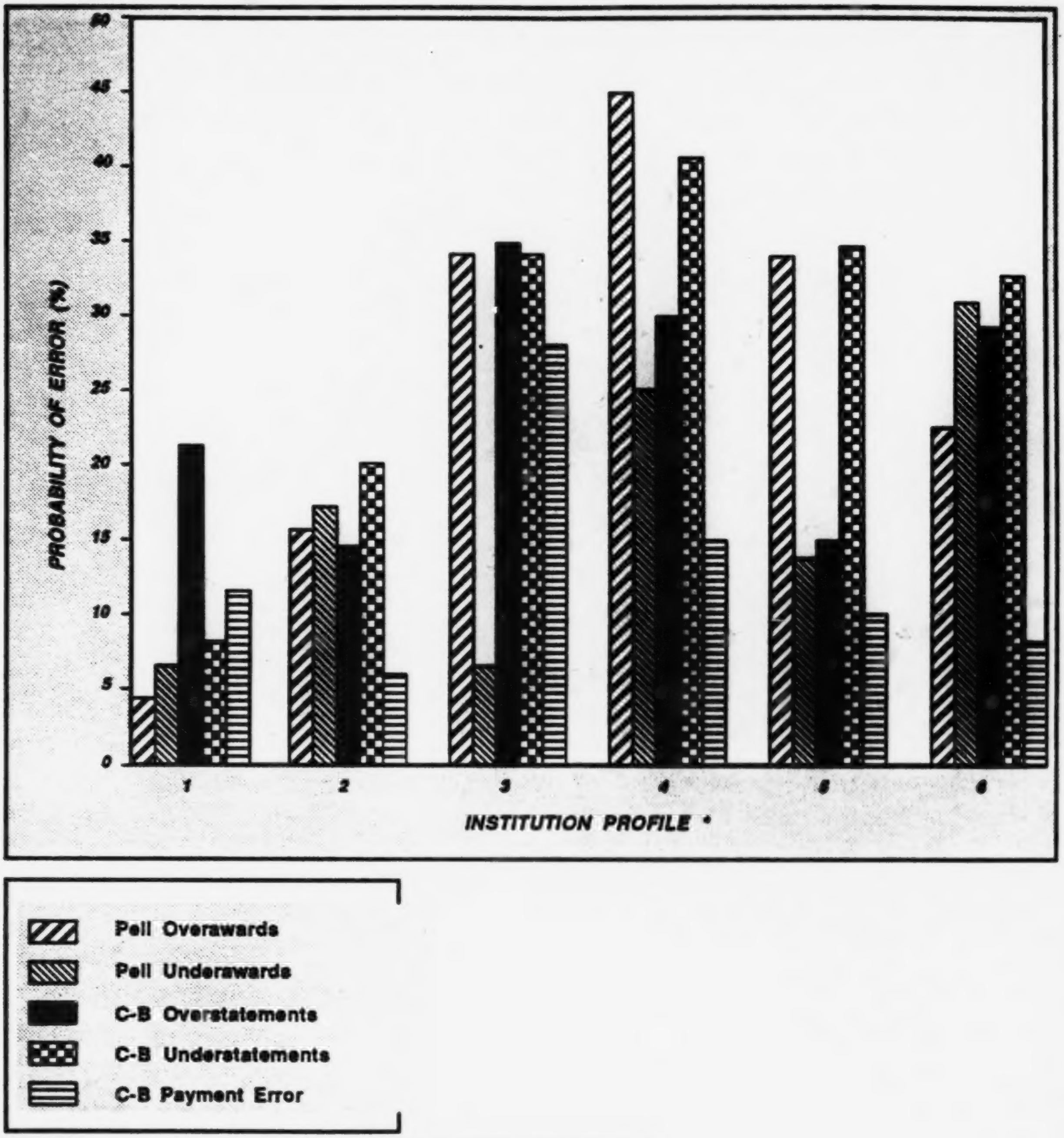
The regression results indicate the importance of institutional quality control procedures in controlling institutional error. In particular, procedures that include sampling seem to be effective. The clustering of procedural-type errors identified in Chapter 2 is a further indication that sampling should be an effective technique for controlling error. Since these errors tend to occur systematically at institutions, a relatively small sample could identify the problem. Taken together, this suggests that the Institutional Quality Control Pilot Project, which is based on sampling recipients, should continue and be further developed and refined. However, because the Pilot exists, at this point, for a limited number of institutions, ED may want to develop informational or technical assistance materials related to institutional quality control procedures for non-participating institutions. In addition, ED should

TABLE 5-7

IMPUTED PROBABILITIES OF ERROR FOR SELECTED INSTITUTION PROFILES, 1985-86

Institutional Error Measure	Profile*					
	1	2	3	4	5	6
	Percent	Percent	Percent	Percent	Percent	Percent
Pell Overawards	4.2	15.7	33.7	45.9	32.6	22.6
Pell Underawards	6.4	17.6	6.4	24.2	13.0	29.9
Campus-Based Overstatements of Need	21.1	15.4	35.1	29.4	14.4	28.2
Campus-Based Understatements of Need	7.5	19.3	34.2	39.7	34.0	31.5
Campus-Based Payment Error (Awards in Excess of Need)	11.2	6.0	27.0	14.8	10.5	8.4

* Profile 1 = "high automation, manual or other/sample QC"
Profile 2 = "high automation, sampling/automated QC"
Profile 3 = "low automation, little or no QC"
Profile 4 = "low automation, manual/other QC"
Profile 5 = "high automation, mixed QC"
Profile 6 = "high automation, automated QC"



* Profile 1 = "high automation, manual or other/sample QC"
Profile 2 = "high automation, automated/sample QC"
Profile 3 = "low automation, little or no QC"
Profile 4 = "low automation, manual/other QC"
Profile 5 = "high automation, mixed QC"
Profile 6 = "high automation, automated QC"

EXHIBIT 5-1. ERROR PROBABILITIES ESTIMATED USING LOGISTIC REGRESSION

draft "Dear Colleague" letters profiling the importance of institutional quality control. Previous corrective actions concerning institutional quality control include the drafting and dissemination of ED's "QC Handbook" to institutions.

5.2 INSTITUTIONAL VALIDATION

Validation is the primary strategy employed to control student error. The Findings report presented evidence concerning the effectiveness of validation along three critical dimensions:

- The ability to target validation to those applications containing errors
- The ability of the validation process to eliminate errors on those applications selected for validation, and
- The ability of the validation process to reduce the amount of error remaining in validated cases.

In this section we go beyond Findings to identify factors that might influence the effectiveness of validation and would be good candidates for possible corrective actions.

5.2.1 Summary from Findings

The following summarizes the major conclusions reached in Findings regarding validation:

Validation in the Pell Grant Program

- Validation activities in the Pell program occurred for 80 percent of the cases and was successful in eliminating error from selected recipients.
- Validation of those recipients selected by the Pell Processor was very successful in targeting and eliminating item discrepancies, although a residual level of discrepancies remained for all recipients.
- About $85 million of error was removed prior to award from cases selected by the Pell Processor; however, the reduction in underawards was slightly greater than the reduction in overawards.
- Institutions chose to validate two-thirds of the cases not selected by the Pell Processor. In cases they selected, institutions were successful in removing payment error but less so than in Pell selected cases. Institutions were not successful in identifying and eliminating item discrepancies.

Validation in the Campus-Based Programs

- Validation activities in the Campus-Based programs were about as extensive as in the Pell program and increased between Stage One and Stage Two in terms of both recipients selected by the Pell Processor and those selected by institutions. Institutions used the Pell Processor flag to select recipients for verification and verified these recipients at a higher rate than non-flagged Campus-Based recipients.
- Recipients receiving aid from multiple programs (e.g., Pell and Campus-Based) were more likely to be verified by institutions.
- Campus-Based recipients selected for Pell validation have the lowest remaining error rates.
- All validated cases have lower item discrepancy for adjusted gross income, although institutional verification is not successful at reducing item discrepancy in general.

Validation in the GSL Program

- Institutions validated Campus-Based and GSL recipients at a higher rate than recipients receiving only GSL's.
- The percent of GSL recipients that are Pell validated is extremely low. If GSL and Pell recipients are in error, they are likely to have a large error.

In general, the results indicate that validation is an effective strategy for reducing student error in the Title IV programs. While this is an important finding, by itself it does not have any implications for corrective actions. If we can relate certain controllable factors to the effectiveness of validation, however, we may be able to identify methods for improving the ability of validation to control error. For example, if a given procedure is found to be related to more successful validation results, then the implementation of this procedure in situations where it is not currently in use might help improve quality. To accomplish this we need to explain the variation in the effectiveness of validation. This is similar to the problem of explaining the variation in institutional error and, for the same reasons discussed in Section 5.1, also needs to be addressed using a multivariate model.

5.2.2 Methodology and Analytic Approach

The first step in the analysis was to define a measure of the effectiveness of validation. The two possible choices were error removed or error remaining. Error remaining, because it considers error only at the end of the award cycle, is not a good measure of the effectiveness of validation. Error removed allows us to assess the extent to which accuracy was improved during the award process, the primary goal of validation. Consequently, the effectiveness of validation was defined in terms of the probability of an error that occurred at the beginning of the award process being removed by the end of the process.

The use of error removed as the measure of effectiveness meant that the analysis had to be limited to the Pell program. To determine if error was removed requires calculating error at both the beginning and the end of the award process. This requires access to a centralized applicant history file which is only available in the Pell program. The exact specification of the measure under consideration, the dependent variable, is a dichotomous variable coded one if a student error on the first CAR transaction was removed by the payment transaction and zero if the error on the first CAR transaction remained through to the payment transaction. Student error was defined as the difference between: the award calculated using data reported on the given transaction, best enrollment status, and best cost of attendance; and the best award.

The factors hypothesized to be related to the probability of an error being removed in the Pell program, the explanatory variables, can be divided into three types:

- Institutional characteristics
    - Type and control
    - Academic calendar
- Student characteristics
    - Effective family income
    - Whether the application was filed before June 1, 1985
    - Dependency status
    - Tax filing status
    - Dollar amount of award error at the beginning of the process
- Validation-related procedures
    - Validation status
    - Professional full-time equivalent financial aid staff

- -- **Clerical full-time equivalent financial aid staff**
- -- **Degree to which verification tracking was automated**
- -- **Whether professional staff conducted validation**
- -- **Average time spent in conducting validation**
- -- **Average number of contacts made in conducting validation**

The student and institutional characteristics included in the model were chosen from those found to be significantly related to error in the bivariate analysis presented in Chapter 6 of Findings. The validation-related procedures were activities associated with the validation process which could be altered by institutions and were hypothesized to be associated with the removal of error.

The purpose of the analysis is to estimate the relationship between the validation-related procedures and error removed, controlling for the effects of student and institutional characteristics. In this way we can determine if there might be activities related to validation which could be altered by institutions to increase the ability of the system to remove error. The appropriate statistical technique for conducting this type of analysis, as stated previously, is multiple regression analysis. As was stated in section 5.1, because the dependent variable is discrete, logistic regression was used to estimate the equations.

5.2.3 Results and Conclusions

Table 5-8 presents the results of the logistic regression model. The results confirm that even in a multivariate analysis controlling for other factors, the probability of an error being removed is significantly higher for Pell selected cases than for not selected cases. Institution

TABLE 5-8

LOGISTIC REGRESSION ESTIMATES OF PROBABILITY OF HAVING AN ERROR REMOVED, 1985-86

SOURCE	EFFECT ON PROBABILITY OF ERROR REMOVAL	SIGNIFICANCE LEVEL
Institutional Characteristics		
* 2-Year (Private and Public)	N/A	N/A
Proprietary	Decrease	Not significant
4-Year Private	Decrease	Not significant
4-Year Public	Increase	Not significant
* Non-Semester	Decrease	Not significant
Semester	Decrease	Not significant
Student Characteristics		
Effective Family Income	Decrease	Not significant
* Application Not filed by 6/1/85	N/A	N/A
Application Filed by by 6/1/85	Decrease	1 percent
* Dependent	N/A	N/A
Independent	Increase	1 percent
* Filed Single Tax Return	N/A	N/A
Filed Joint Tax Return	Decrease	Not significant
Did Not File Tax Return	Decrease	Not significant
Error on First Transaction	Increase	1 percent
Validation Related Procedures		
* Not Validated	N/A	N/A
Pell Validated	Increase	1 percent
Institution Validated	Increase	Not significant
* Less Than 5 Professional FTE's	N/A	N/A
5 or More Professional FTE's	Increase	Not significant
* Less Than 4 Clerical or Data Entry FTE's	N/A	N/A
4 or More Clerical or Data Entry Entry FTE's	Increase	Not significant

*N/A indicates that these characteristics were omitted from the regression and are captured in the intercept.

TABLE 5-8 (Continued)

LOGISTIC REGRESSION ESTIMATES OF PROBABILITY OF HAVING AN ERROR REMOVED, 1985-86

SOURCE	EFFECT ON PROBABILITY OF ERROR REMOVAL	SIGNIFICANCE LEVEL
Validation Related Procedures (Cont.)		
* Validation Tracking Not Automated	N/A	N/A
Validation Tracking Partially Automated	Decrease	Not significant
Validation Tracking Fully Automated	Decrease	Not significant
* Non-Professional Staff Conduct Validation	N/A	N/A
Professional Staff Conduct Validation	Decrease	Not significant
* Less Than 10 Minutes Per Validation	N/A	N/A
14-20 Minutes Per Validation	Increase	Not significant
21-30 Minutes Per Validation	Increase	Not significant
Over 30 Minutes Per Validation	Increase	Not significant
* Four or More Contacts Per Validation	N/A	N/A
Three Contacts Per Validation	Increase	Not significant
Two or less Contacts Per Validation	Increase	Not significant

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*N/A indicates that these characteristics were omitted from the regression and are captured in the intercept.

selected cases also have a higher probability of having an error removed than not selected cases, although the difference is not statistically significant.

Besides confirming the bivariate analysis presented in Findings that validation, particularly of cases selected by the Central Processor, was successful at removing error, there are few significant results. None of the institutional procedures which were felt might improve the effectiveness of validation are found to be significantly related to higher probabilities of having an error removed. Higher levels of professional and clerical staff size, automation of verification tracking, having professional staff conduct validation, and increased time and number of contacts employed in conducting validation are not related to higher probabilities of error removal, contrary to what was hypothesized. Institutional characteristics, such as type and control of institution and whether a semester system was used, are also not related to the probability of having an error removed.

In addition to validation, error removal is only found to be related to certain student characteristics. Independent students are more likely to have an error removed, while students filing their aid applications before June 1, 1985 are less likely to have had an error removed. The higher the amount of error at the beginning of the process, the higher the probability that the error was removed. This suggests that institutions were more conscientious about conducting validation, if there appeared to be large errors present.

The (model) results lead to two conclusions. First, there is an increased probability of having an error removed if a recipient were selected for validation by the Central Processor, as opposed to optionally by the institution. This indicates that the implementation of the integrated verification criteria for Pell non-recipients should increase the amount of error removed, even if the percent of Pell non-recipients verified remains the same. Just switching from voluntary verification of Pell non-recipients to the integrated verification criteria should improve error removal. The superior results obtained given selection by the Central Processor for Pell recipients should also be obtained for non-Pell recipients selected through the integrated verification criteria, given the similarities between the two processes.

The second conclusion concerns the fact that there appears to be no relationship between controllable institutional procedures related to validation and the probability of an error having been removed. This suggests that there are no readily apparent corrective actions for improving the effectiveness of validation without changing the nature of the validation process itself. If certain institutional procedures had been related to higher probabilities of error removal, then wider implementation of these procedures might have improved the effectiveness of validation without requiring alteration to the process. Procedures that, had they been significantly related to removing an error, could have been implemented include:

- The type of validation tracking an institution used
- The type of staff conducting validation, or
- The time or number of contacts spent validating cases.

However, because no procedure of this type is identifiable from the results of the model, further improvement in the effectiveness of validation necessitates improving the process for selecting students for validation.

In Chapter 2, we showed how the use of tax forms could also help identify and possibly limit errors in home value, savings, and dependent's net assets. Since these data items are not currently part of the validation process, adding them is a potential method for improving the effectiveness of validation. However, this would also increase the burden placed on institutions. Given that 72 percent of institutions, in response to a question posed in the Institutional Questionnaire, felt that the average time spent on validation had increased in 1985-86, there would likely be much dissatisfaction with any proposal further expanding the requirements of validation. Again, better targeting of error-prone cases is a cost-effective solution.

6.0

SIMPLIFICATION OF THE UNIFORM METHODOLOGY

This chapter presents the results of our analyses of the effects of reducing the number of data elements used in the Uniform Methodology (UM) formula. The UM formula is used to determine a student's Expected Family Contribution (EFC) in the Campus-Based programs. Reducing the data elements that comprise the UM is a Level IV corrective action. Significantly restructuring the UM formula will affect the largest portion of residual error of all corrective actions presented in this report. In general, our analyses indicated the following concerning truncating the UM formula:

- The distributions of need in the Campus-Based programs and certification in the GSL programs resulting from the reduced formula closely approximates the intended distributions
- Most recipients have minimal changes in their Campus-Based need and GSL certification under the reduced formula
- Student error in the Campus-Based and GSL programs is significantly lower under the reduced formula, and
- Adjusting aspects of the truncated formula could improve on the effectiveness of the reduced formula.

These findings are discussed in detail in the following sections. In addition a paper entitled "Need Analysis: Thoughts For Reform," authored by the NASFAA Need Analysis Standards Committee, is reproduced in Appendix C.

6.1 SUMMARY FROM PRIOR ANALYSIS

The findings from numerous quality control studies, and a pervasive perception that student aid in general, and the formulae used to determine eligibility and need for Federal financial aid funds in particular, are too complex, has led to a widespread interest in simplifying these formulae. In Stage One of the current study, ED conducted a multifaceted assessment of Pell simplification which focused on equity and quality issues. This assessment employed an analytic framework to evaluate and rank individual data elements across key criteria (e.g., budgetary, distributional, reliability etc.). The ranking produced a set of data elements that could be eliminated from the formula with little impact across numerous dimensions.

In keeping with the dual focus on equity and quality, the Stage One analysis of simplifying the Pell Family Contribution Schedule (FCS) was the first that took into account both adjusting the formula and controlling for reporting error. This analysis of a six element formula led policymakers to conclude that prior analyses, which did not control for reporting errors, overstated the distributional and budgetary effects of simplification. In the analysis that used verified values, the negative budgetary and distributional consequences of simplification were reduced substantially.

These findings provided the impetus for Congressional action in the recent reauthorization of the Higher Education Act. The reauthorized Act now requires the Secretary of Education to produce a six element Pell form for families with income under $15,000.

In addition to the recent Congressional action, the Stage Two findings indicating high levels of reporting error in the Campus-Based programs have kindled interest in the potential for simplifying the Uniform Methodology (UM), the system for determining the expected family contribution (EFC) for the Campus-Based programs.

The potential advantages of, and arguments for, considering simplification of the UM are manifold. First, simplification can reduce the length and complexity of forms. This change would enhance applicant understanding and perhaps reduce inadvertent misreporting. It would also reduce applicant burden and certain processing costs. In addition, a shortened formula could increase understanding on the part of applicants and some student aid personnel of how programs distribute aid and also reduce institutional burden associated with verification and institutional processing costs in general. From a system-wide perspective, a shortened UM formula makes integration of the Title IV programs more feasible and easily accomplished.

In many ways the arguments for simplification are stronger with the UM than with the FCS. The loose tie between need and awards suggests that small to moderate changes in the distribution of need could occur as a result of simplification with little impact on Campus-Based awards. In Pell, however, the relationship between SAI and award is direct, and, thus, changes in the distribution of SAI's that result from simplification have a greater impact on Pell awards.

Perhaps the single disadvantage of UM simplification is the potential for significant distributional consequences. If these changes cause large need shifts, or shifts in different directions for different subpopulations, Campus-Based awards could be affected for these subpopulations.

In this chapter we explore whether reporting error in the Campus-Based programs is serious enough to consider simplifying the UM. Although the answer to this question may appear self-evident to some in light of the Findings volume, the measures used to describe the errors are high level aggregations and tend to obscure the distributional effects of error on different subpopulations. Thus, we will analyze the effects of error by examining how it changes need across various subpopulations. We do so first by addressing the question: How far from an equity benchmark is the current system, and what is the direction of the deviation? An equity benchmark in this analysis can be created by developing a distribution of need with the full UM formula and verified data. Substantial deviation of the current system from this benchmark would argue strongly for simplifying the UM, especially if the target population (i.e., low income recipients) were being hurt by the current system.

In that case a second set of questions is appropriate. First, what would be the effect of truncating the UM and using a six element formula similar to the simplified Pell formula. Second, would an alternative formula be required. These questions are explored in the following sections.

Simplification, by its nature, is a long-term corrective action. Because of impending policy changes required by reauthorization, simplification will be implemented under conditions that are different from current procedures. The change from prospective to base year income constitutes a major change that must be controlled for, if the present analysis is to be a useful guide to policymakers. Thus, this simulation analyzes the effects of simplication under the conditions in which it would be implemented.

6.2 METHODOLOGY AND ANALYTIC APPROACH

The following sections describe the procedures we used to analyze simplification of the UM formula. We first describe how we defined a shortened formula, and then discuss how we used alternative models to simulate the effects of this shortened formula and the criteria used to evaluate the shortened formula.

6.2.1 Formula Redefinition

The UM methodology was redefined to include only those items included in the reduced Pell formula defined in "Data Element Reduction." The remaining data items are:

- **Dependency status**
- **Adjusted gross income**
- **Federal taxes**
- **Other non-taxable income**
- **Household size, and**
- **Number in college.**

Despite the use of identical data elements, simplification will have substantially different effects on the Campus-Based population, due largely to the differences between the Pell Family Contribution Schedule and the UM. Income items in the reduced EFC formula reflect base year values for both dependents and independents. Base year income values were used to capture the change in regulations requiring the use of base year income rather than prospective income for independent students under the Uniform Methodology. The change in regulations also specified that an EFC be calculated, using the Uniform Methodology, for all GSL recipients regardless of Family AGI. This also means that Campus-Based recipients with Family AGI's of $30,000 or less can no longer borrow their EFC.

The following summarizes the effects of eliminating the selected data items from the formula:

- Income portions substituted for AGI for non-filers
- Social Security benefits and AFDC included in Other Non-Taxable Income
- **Assumptions based on eliminated data items no longer valid**
- Summer Savings set to $900 for dependents, $0 for independents
- Dependent applicants rejected if no income or household size reported
- Educational VA benefits excluded from formula
- Federal Tax computation eliminated from formula
- FICA tax figured on total AGI and capped at $3,800

- **State tax rate assumed 4 percent for dependent parents and 0 for independents**
- **Medical, Tuition, and Employment Expense Offsets eliminated**
- **Maximum contribution from total income based solely on household size**
- **No student contribution for dependents, and**
- **Assets eliminated from formula.**

The two most pronounced effects of the reduction in the number of data elements is the elimination of several expense offsets and the contribution from assets. The elimination of offsets to income increases EFC and, thereby, decreases need. In the aggregate, for independent students, the removal of assets from the formula tends to counter the effect of eliminating income offsets. Recipients whose net assets exceed the protection allowance (which is based on age) under the current formula show a decrease in EFC and increase in need under data element reduction. Since the vast majority of independent students had contributions from assets of less than $100, the impact of eliminating assets is limited to a relatively small number of students.

The impact of eliminating assets on dependent students is not as straightforward, however. Under the current formula, assets can reduce EFC for certain dependent students. The parents of dependent students whose net worth is negative (i.e., net assets are less than the protection allowance) can have a negative contribution from assets. If net worth is negative and available income (income minus offsets) is less than $15,000, then available resources and, hence, parental contribution and EFC are reduced rather than increased by the contribution from assets. Removing assets from the formula for dependent students can, therefore, increase EFC and reduce need for some students, while decreasing EFC and increasing need for others.

Table 6-1 indicates that for nearly 60 percent of dependent students, assets act to reduce EFC under the current formula. The negative contribution from assets is most prevalent among the lowest income group and diminishes as income rises. Consequently, for a large number of dependent students, particularly low income students, the elimination of assets from the formula causes EFC to rise and need to fall. Dependent students' own assets can only increase EFC under the current formula. However, as with independent students, nearly all dependent students had contributions from their own assets of less than $100. Thus, elimination of dependent student assets is likely to have a small impact on need.

In conclusion, assets often do not result in increases in EFC and, for dependent students, may result in decreases under the current formula. Hence, eliminating assets, based on the analysis, does not cause large decreases in EFC and increases in need. This, in conjunction with the decreases in need caused by the elimination of several income offsets, means that need should most likely decrease, using reported data, in the aggregate due to data element reduction.

6.2.2 Model Definition and Evaluative Criteria

Combining the two formulae (full and reduced) with the two levels of data (best and reported) yields four models for analysis and comparison:

- Full formula using best data
- Full formula using reported data
- Reduced formula using best data, and
- Reduced formula using reported data.

TABLE 6-1

IMPACT OF ASSETS ON DEPENDENT STUDENTS' EFC UNDER THE CURRENT FORMULA, 1985-86

INCOME LEVEL	ASSETS DECREASE EFC		ASSETS INCREASE EFC	
	PERCENT	MEAN	PERCENT	MEAN
$10,000 or less	75.0	1,565	25.0	3,501
$10,001 - $15,000	71.3	1,427	28.7	2,754
$15,001 - $25,000	66.4	1,071	33.6	3,240
* Greater than $25,000	40.9	450	49.6	4,035
** All Recipients	59.7	1,102	36.9	3,599

* In 9.5% of cases there was no effect on EFC
** In 3.4% of cases there was no effect on EFC

As defined, EFC determined under data element reduction can differ from that obtained under the current formula for three reasons:

- The elimination of data elements
- The use of base year rather than prospective income for independent students, or
- The calculation of an EFC for all GSL recipients regardless of family AGI.

The latter two differences result from changes already specified in the regulations and are not directly related to data element reduction. In addition, the change from prospective to base year income was already analyzed in Chapter 3. Measuring just the impact of data element reduction, therefore, requires eliminating the effects of these other two changes.

To focus our analysis specifically on the impact of data element reduction, we redefined the full best and full reported models to include the changes specified by the new regulations -- base year income used for all students and EFC's calculated, using the UM, for all GSL recipients. In this way, the difference between the full and reduced models is only caused by the elimination of data elements. Redefining the full models means that, unlike in Chapters 3 and 4, the full reported model is no longer observed, but rather is simulated. Consequently, students can be found to have zero need under the full reported model even though they actually received Campus-Based aid and/or a GSL. (This could also happen due to the problem of initial overawards discussed in Chapter 5 of

Findings.) Also, the error rate occurring under the full model (i.e., full best compared to full reported) is based on the changed regulations (e.g., income error is base year for independents rather than prospective income), and hence does not equal the error rates found for the current formula presented in Findings.

Campus-Based need and GSL certification are computed under each model. Pell awards are also computed for each of the four models because Pell eligibility changes under data element reduction and this change also affects need for the Campus-Based and GSL programs. Campus-Based need for each model is determined by subtracting the EFC, the Pell award, and, if packaged before Campus-Based, the GSL award computed for that model, and other aid from the cost of attendance. The GSL certification for each model is determined by subtracting the EFC, Pell, and Campus-Based awards, if packaged before GSL, computed under that model and other aid from the cost of attendance. The Campus-Based award for GSL purposes is taken as the minimum of the actual Campus-Based award and the Campus-Based need computed under the given model. Other aid and cost of attendance are held constant across all models at the values originally used by the institution ("reported" values).

As many as six comparisons of any two models can be made among the four. The subsequent sections of this chapter discuss the more meaningful of these comparisons. The three comparisons which include the full best model indicate the relative merit of each of the other three

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models based on similarity to optimality. Comparisons made by holding the level of data constant measure the impact of the reduction of data elements. Holding data at reported values captures the impact of data element reduction under the current level of data. Holding data at best values captures the "true" impact of data element reduction. Comparisons made by holding the formula constant and varying the level of data measure the effect of student misreporting on each of the two formulae. These effects can then be compared to assess the validity of the two formulae. Model closeness, joint distributions of need or certification, summaries of student error, and analysis of loss and gain of need and certification are discussed in the sections which follow.

6.3 RESULTS AND CONCLUSIONS: CAMPUS-BASED MODELS

The following sections present an assessment of the relative performance of the Campus-Based models according to several different measures. These measures include how effective the alternatives are in distributing need among the intended recipients, what the impact on need is under the alternative models, and what student need error would be under the reduced formula compared to the full formula. All of these measures should be assessed when evaluating the reduced formula.

6.3.1 Need Distribution Under the Campus-Based Models

The degree to which a given UM model assesses need in the Campus-Based programs in a manner similar to the intended or optimal assessment, can be determined by looking at the percent of total need represented by various income groups under the different models. The intended assessment is the distribution of need obtained under the full best model. Table 6-2 presents these figures for dependent recipients and Table 6-3 shows the analogous figures for independent students.

As Table 6-2 shows, the intended distribution of Campus-Based need for dependent students is that families with incomes of $10,000 or less should represent 21.6 percent of total need, families with incomes of $10,001 to $15,000 have 17.8 percent, those with $15,001 to $25,000 income have 38.7 percent, and families with incomes of more than $25,000 should represent 21.8 percent of total need. The differences between these percentages and the percentages for the full formula using reported data show the extent to which reporting error redistributes total need away from the intended distribution. These figures show that reporting error redistributes need from the lowest three income categories to those families with incomes greater than $25,000. This can be seen by the fact that families with $10,000 or less in income drop from 21.6 percent of need under the full best model to 19.0 percent under full reported. Families with $10,001 to $15,000 go from 17.8 percent to 16.1, those with $15,001 to $25,000 from 38.7 percent to 37.7, and the highest group from 21.8 percent to 27.2 percent.

Using a reduced formula with best data moves the distribution closer to the intended distribution than the full reported model. The percentages of need that the income groups represent under the reduced

TABLE 6-2

PERCENT OF TOTAL NEED FOR CAMPUS-BASED DEPENDENT RECIPIENTS BY INCOME LEVEL UNDER ALTERNATIVE MODELS, 1985-86

INCOME LEVEL	FULL BEST	FULL REPORTED	REDUCED BEST	REDUCED REPORTED
$10,000 or less	21.6	19.0	20.8	19.1
$10,001 - $15,000	17.8	16.1	16.7	16.6
$15,001 - $25,000	38.7	37.7	36.9	35.9
Greater than $25,000	21.8	27.2	25.6	28.5

TABLE 6-3

PERCENT OF TOTAL NEED FOR CAMPUS-BASED INDEPENDENT RECIPIENTS BY INCOME LEVEL UNDER ALTERNATIVE MODELS, 1985-86

INCOME LEVEL	FULL BEST	FULL REPORTED	REDUCED BEST	REDUCED REPORTED
$2,000 or less	29.8	27.0	37.1	35.3
$2,001 - $4,000	18.2	17.0	16.6	16.9
$4,001 or $8,000	33.9	35.2	27.7	27.6
Greater than $8,000	18.1	20.9	18.7	20.3

best model, as compared to full reported model, shift need from the highest two income groups to the two lowest. While the amount of this shift is not enough to compensate for the reporting error under the full formula, the distribution under the reduced best model is closer to the intended distribution than the distribution under the full reported model in three of the four income level groups.

A similar pattern also exists among the four models for independent students. However, under the reduced best model, the lowest income students gain in percentage of need while students in the second and third groups have slightly smaller percentages of need.

Table 6-4 shows a composite analysis of dependent and independent students of the percentages of need each income group represents. The income groups have been held constant in this table for both independent and dependent recipients. Thus, the lowest income group in Table 6-4 includes dependent students with family income of $10,000 or less and independent recipients with income of $2,000 or less. This composite table shows that the reduced best formula comes very close to the intended distribution, but that the lowest and highest income groups gain slightly (from 24.5 percent to 25.3, and from 20.5 to 23.7 respectively) in percentage of need, while the second and third income groups lose slightly (from 18.0 to 16.6 and from 37.0 to 34.4). Therefore, reducing the UM formula shows promise in achieving a distribution of need closer to the intended distribution than the current distribution.

TABLE 6-4

PERCENT OF TOTAL NEED FOR ALL CAMPUS-BASED RECIPIENTS BY INCOME GROUPS UNDER ALTERNATIVE MODELS, 1985-86

INCOME GROUP	FULL BEST	FULL REPORTED	REDUCED BEST	REDUCED REPORTED
Lowest	24.5	21.8	25.3	23.7
Second	18.0	16.4	16.6	16.7
Third	37.0	36.8	34.4	33.5
Highest	20.5	25.0	23.7	26.1

The amount of total need changes under each of the four models. Table 6-5 shows that true need is $3,096.2 million and reporting error overstates need by nearly $400 million. Need under the reduced formula comes very close to true need, and reporting error under the reduced formula (approximately $40 million) causes less of a shift away from true need (than reporting error under the full formula).

6.3.2 Need Amounts Under the Campus-Based Models

In addition to measuring the degree to which total need is distributed under the alternative models, one should consider the direction of the flow of need among recipients. The block charts presented as Exhibits 6-1 and 6-2 illustrate the change in need occurring when comparing a pair of models. The axes define groups of recipients by need values under the respective models. The height of the block in each of the cells indicates the percentage of recipients in the cell. Blocks lying along the diagonal running from lower left to upper right represent recipients with small or no change in need. Blocks lying directly off of the diagonal represent recipients with moderate need changes, while blocks in the upper left and lower right corners represent recipients with extreme need changes. Blocks above the diagonal indicate higher need for the model represented by the vertical axis. Conversely, blocks below the diagonal indicate higher need for the model represented by the horizontal axis.

The block charts presented illustrate two comparisons of changes under the full and reduced models. These two comparisons are the

TABLE 6-5

TOTAL CAMPUS-BASED NEED UNDER ALTERNATIVE MODELS, 1985-86

MODEL	TOTAL NEED ($ Millions)
Full Best	3,096.2
Full Reported	3,493.4
Reduced Best	3,132.7
Reduced Reported	3,173.5

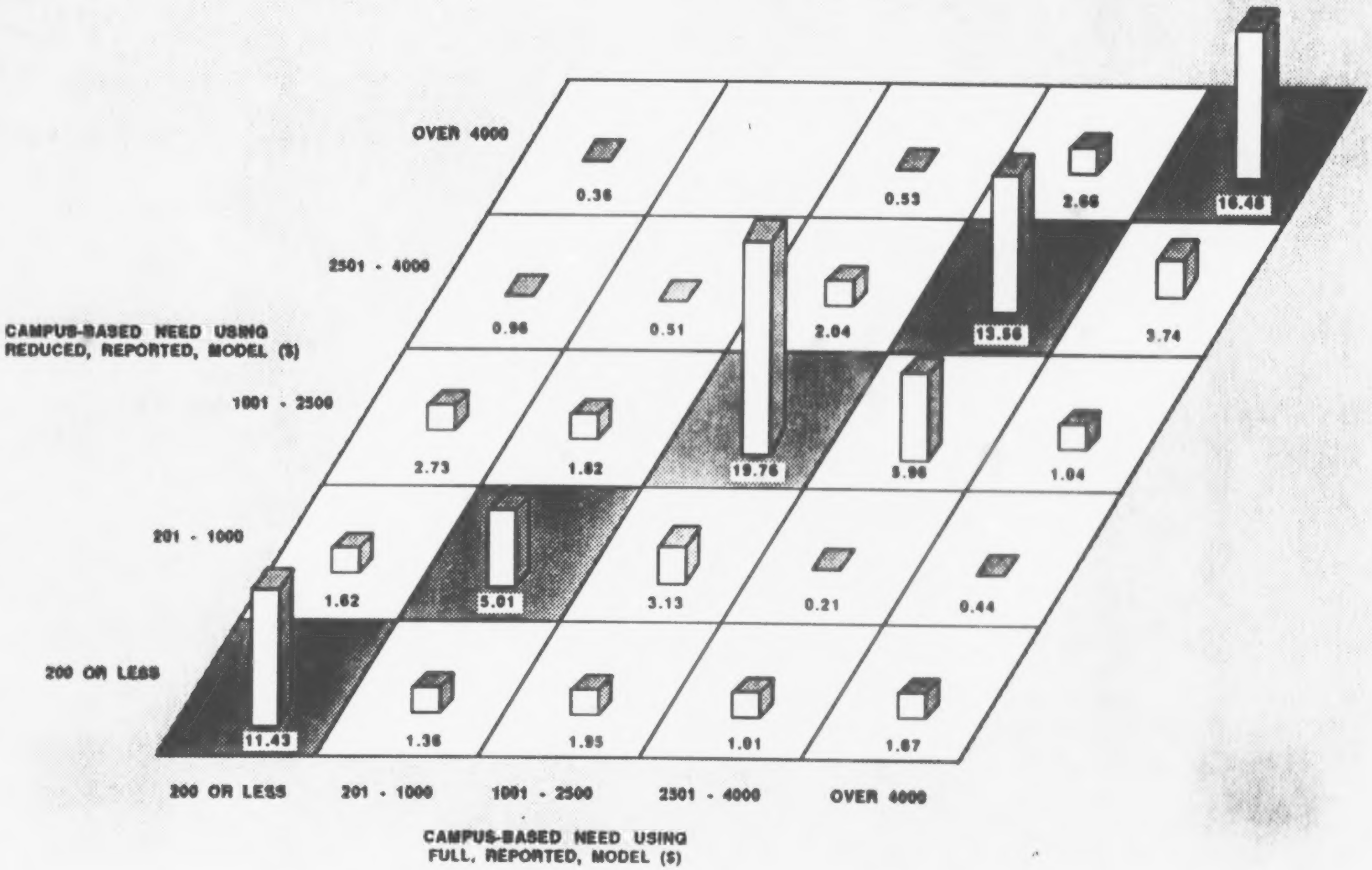

EXHIBIT 6-1. CAMPUS-BASED NEED UNDER FULL AND REDUCED UM MODELS USING REPORTED DATA
(PERCENTAGE BLOCK CHART)

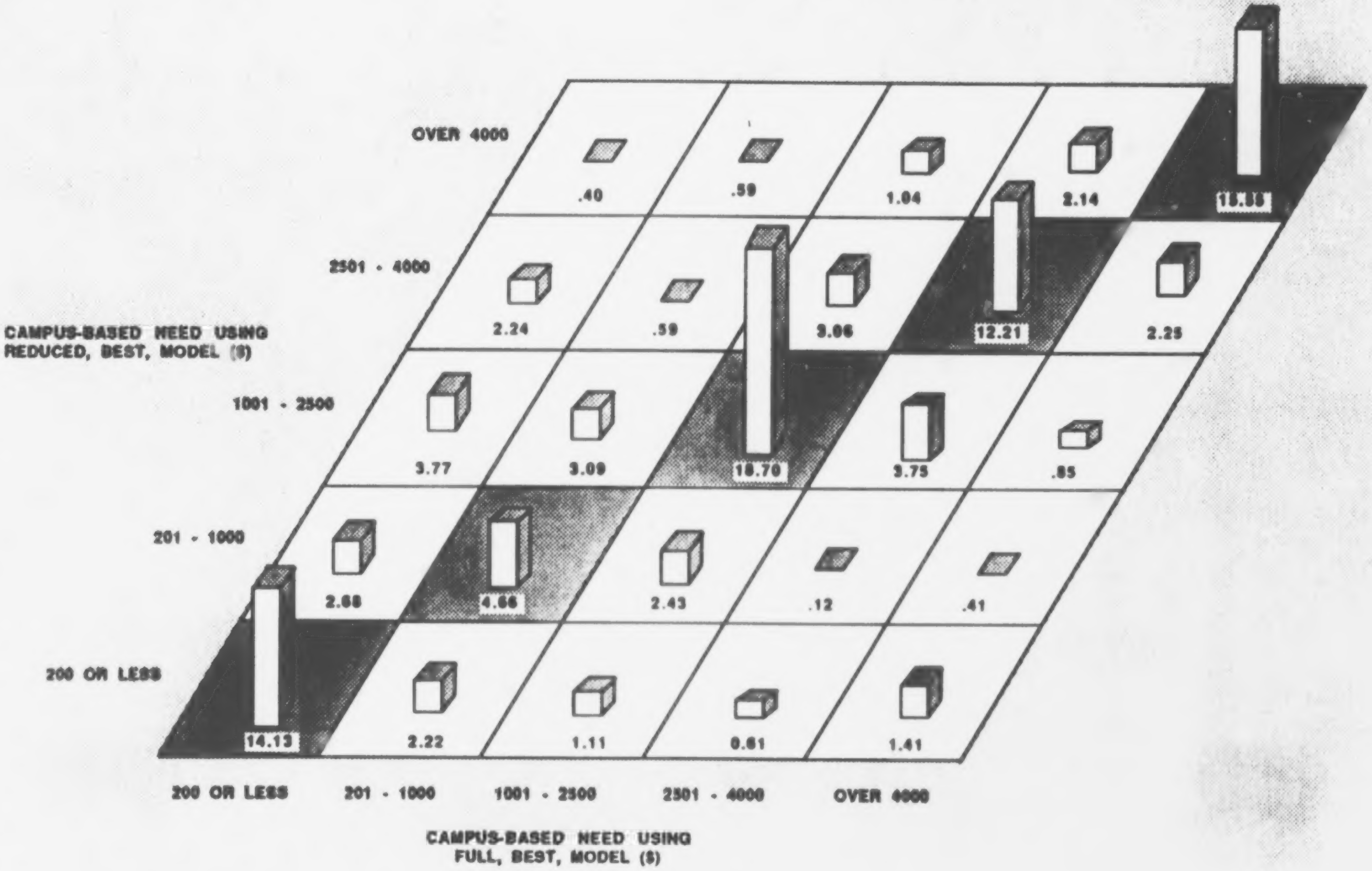

EXHIBIT 6-2. COMPARISON OF CAMPUS-BASED NEED UNDER FULL AND REDUCED UM MODELS USING BEST DATA (PERCENTAGE BLOCK CHART)

apparent and true effects of shortening the formula. The apparent effects can be determined by looking at how need changes using reported data and the true effects can be assessed by looking at the full and reduced models using best data.

Exhibit 6-1 shows the distribution of Campus-Based need under the full reported model along the vertical axis, paired with reduced reported model, along the horizontal axis. This pair represents the apparent impact of data element reduction on Campus-Based need. The chart shows taller blocks below the diagonal than below, with 66 percent of recipients receiving roughly the same award under both formulae. Exhibit 6-1 also shows that roughly 21 percent of recipients' need decreases under the reduced formula while only 13 percent of recipients increase need under the reduced model.

Exhibit 6-2 displays the distribution of Campus-Based need comparing full best model along the horizontal axis with reduced best model along the vertical axis. This represents the true impact of data element reduction on Campus-Based need. As in Exhibit 6-1, the blocks are tallest along the diagonal. Exhibit 6-2 shows that approximately 20 percent of recipients gain in need and 15 percent have their need reduced. Disputing the apparent effect of reducing the number of data elements the (difference between full reported and reduced reported), Exhibit 6-2 shows that the true effect (the difference between full best and reduced best) is a modest increase in need rather than a decrease.

6.3.3 Student Need Error Under the Campus-Based Models

In analyzing the effects of data element reduction it is helpful to compare the effects of student misreporting on need under the full and reduced formulae. Table 6-6 summarizes Campus-Based student need error under the full and reduced models. The overall error rate is nearly 55 percent under the full formula. (This result is not comparable to analyses in Findings because base year income was substituted for prospective income.) The reduced formula has an overall error rate of just over 41 percent. The average understatement is $159 higher under the reduced formula. Total understatements are $28.4 million higher under the reduced formula and the overstatement rate is 13.1 percentage points higher under the full formula. The average overstatement is nearly $400 higher under the full formula, and overstatements total $328.2 million less under the reduced formula. Total net need error is almost 10 times higher under the full formula.

6.3.4 Conclusions of Campus-Based Alternatives

By looking at the evaluative criteria just discussed, shortening the UM formula shows promise in increasing the accuracy and efficiency of determining need in the Campus-Based programs. The distribution of need under a reduced formula overcomes to a degree the distortions from the intended distribution caused by student reporting error. The distribution of need under the reduced model appears especially attractive since the target group of recipients, those in the lowest income groups for independent and dependent recipients, gain slightly relative to the other income groups.

TABLE 6-6

CAMPUS-BASED STUDENT NEED ERROR UNDER THE FULL AND REDUCED FORMULAE*, 1985-86

	NO ERROR (Within $50)	UNDERSTATEMENTS			OVERSTATEMENTS			NET NEED ERROR	
	Percent	Percent	Mean	Total ($ Million)	Percent	Mean	Total ($ Million)	Mean	Total ($ Million)
Full Formula	45.5	15.7	849	170.7	38.8	1,143	567.4	310	396.7
Reduced Formula	58.8	15.4	1,008	199.1	25.7	726	239.2	31	40.1

---

* Deleting prospective income for all recipients.

Furthermore, because the amount of need recipients have under the two models is nearly the same over 60 percent of time, and the amount of student need error under the reduced formula decreases dramatically, the possibility of the reduced formula achieving its goals is significant. The ultimate reduced formula might not take the same form or have the same data elements as the reduced formula used for these analyses. However, because simply truncating the formula produced such positive results, slight modifications to the reduced formula (either in its data elements or the tax rates used) could increase the effectiveness of a reduced element formula even more.

6.4 RESULTS AND CONCLUSIONS: GSL MODELS

The following sections present the results of analyzing the effects of reducing the UM formula in the GSL program. The evaluative analyses we present are the same as those presented for the Campus-Based programs. We will first show the effects on the distribution of certification by income level, then the impact on certification amount, and finally student error under the full and reduced formulae.

6.4.1 Certification Distribution Under the GSL Models

Tables 6-7 and 6-8 show the distributional effects on GSL certifications of shortening the UM. Table 6-7 presents the figures for dependents and Table 6-8 for independents. (Table 6-9 collapses across dependency status.) Table 6-7 shows that for dependent recipients, the reduced model with best data comes closer to the benchmark than using a

TABLE 6-7

PERCENT OF TOTAL CERTIFICATION FOR GSL DEPENDENT RECIPIENTS BY INCOME LEVEL UNDER ALTERNATIVE MODELS, 1985-86

INCOME LEVEL	FULL BEST	FULL REPORTED	REDUCED BEST	REDUCED REPORTED
$10,000 or less	20.0	16.2	20.0	18.4
$10,001 - $15,000	13.7	11.7	12.0	12.0
$15,001 - $25,000	24.1	22.3	24.3	24.3
Greater than $25,000	42.2	49.8	43.6	45.3

TABLE 6-8

PERCENT OF TOTAL CERTIFICATION FOR GSL INDEPENDENT RECIPIENTS BY INCOME LEVEL UNDER ALTERNATIVE MODELS, 1985-86

INCOME LEVEL	FULL BEST	FULL REPORTED	REDUCED BEST	REDUCED REPORTED
$2,000 or less	27.6	21.9	35.1	27.9
$2,001 - $4,000	15.9	12.7	16.1	14.3
$4,001 or $8,000	24.4	22.0	19.4	18.0
Greater than $8,000	32.2	43.4	29.4	39.8

TABLE 6-9

PERCENT OF TOTAL CERTIFICATION FOR ALL GSL RECIPIENTS BY INCOME GROUPS UNDER ALTERNATIVE MODELS, 1985-86

INCOME GROUP	FULL BEST	FULL REPORTED	REDUCED BEST	REDUCED REPORTED
Lowest	22.9	18.5	24.9	21.8
Second	14.6	12.1	13.4	12.8
Third	24.2	22.3	22.7	22.1
Highest	38.3	47.2	39.0	43.3

full formula with reported data. While under the reduced best model, dependents with family incomes of greater than $25,000 gain slightly (from 42.2 percent of certifications to 43.6 percent), the extent of the gain is less than occurs due to reporting error under the full formula (a 7.6 percentage point difference). Dependent students with family incomes of $10,000 or less receive 20 percent of total certifications under both full and reduced formulae.

The results for independents shown in Table 6-8, indicate a redistribution from the two highest income groups to the two lowest under the reduced best model. The lowest income group of independents increases from 27.6 percent of total certification to 35.1 percent under the reduced best model. Reporting error under the full formula causes a large amount of redistribution in the opposite direction: from the lowest three income levels to the highest income group which increases from 32.2 percent to 43.4 percent.

Table 6-9 presents the effects when collapsing by income group. In general, the data in this table suggest that, in the aggregate, a reduced element formula closely approximates the benchmark model. While the highest and lowest income groups gain slightly, the distribution under the reduced formula is closer to the intended distribution than the full reported model in each of the four categories. The full reported model redistributes certification from the three lowest income groups to the highest group.

Just as total need changed under the Campus-Based models, total certification will also change under the GSL models. Table 6-10 shows that reporting error causes total certification to differ dramatically under the full formula. This table also shows that certification amounts under the reduced models are significantly closer to the intended certification than full formula reported certification. In addition, the amount of reporting error is much less under the reduced model. The amount of certification presented in Table 6-10 does not agree with the figures presented in Findings due to the changes simulated based on reauthorization. The most critical of the changes is that the figures in Table 6-10 assume that all recipients will go through need analysis.

TABLE 6-10

TOTAL GSL CERTIFICATION UNDER ALTERNATIVE MODELS*, 1985-86

MODEL	TOTAL CERTIFICATION** ($ Millions)
Full Best	4,221.7
Full Reported	5,314.5
Reduced Best	4,442.2
Reduced Reported	4,650.2

* All recipients go through need analysis.

** Due to a revision in the estimate of total GSL loan volume, these figures should be reduced by approximately 10 percent.

6.4.2 Certification Amounts Under the GSL Models

Exhibit 6-3 illustrates the apparent effects of shortening the formulas for undergraduates in the GSL program by showing the distribution of GSL certifications under the full reported model along the horizontal axis and the reduced reported model along the vertical axis. As with the Campus-Based models, the apparent effects of shortening the formula is to reduce certifications. Exhibit 6-3 shows that under a reduced formula roughly 23 percent of GSL certifications would decrease and 13 percent would increase (65 percent would have little or no change).

Exhibit 6-4 represents the true affects of shortening the formula for undergraduates by showing the distribution of GSL certifications under the full best model along the horizontal axis and the full reported model along the vertical axis. Exhibit 6-4 shows that the true effects of shortening the formula for undergraduate GSL certifications is that 10 percent decrease, 17 percent increase, and 73 percent have little or no change.

Exhibits 6-5 and 6-6 show the same distributions represented by Exhibits 6-3 and 6-4 respectively, but include only graduate students. In Exhibit 6-5, which shows the apparent effects, nearly 17 percent of graduate students have decreased certifications while only 8 percent have increased certifications. Exhibit 6-6, representing the true effects, shows that 15 percent of graduate students have decreased certifications and 14 percent have increased certifications. Of those graduate students

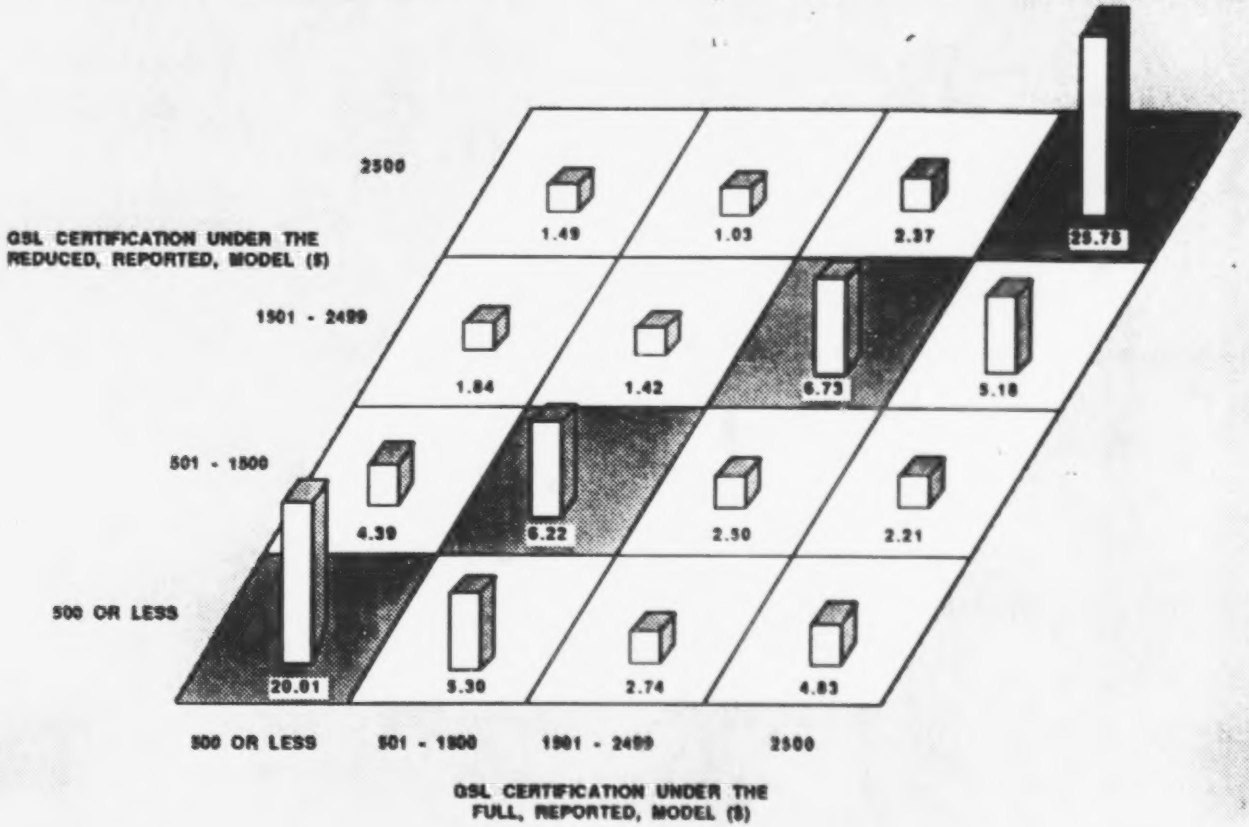

EXHIBIT 6-3. COMPARISON OF GSL CERTIFICATION UNDER FULL AND REDUCED UM MODELS USING REPORTED DATA FOR UNDERGRADUATE STUDENTS (PERCENTAGE BLOCK CHART)

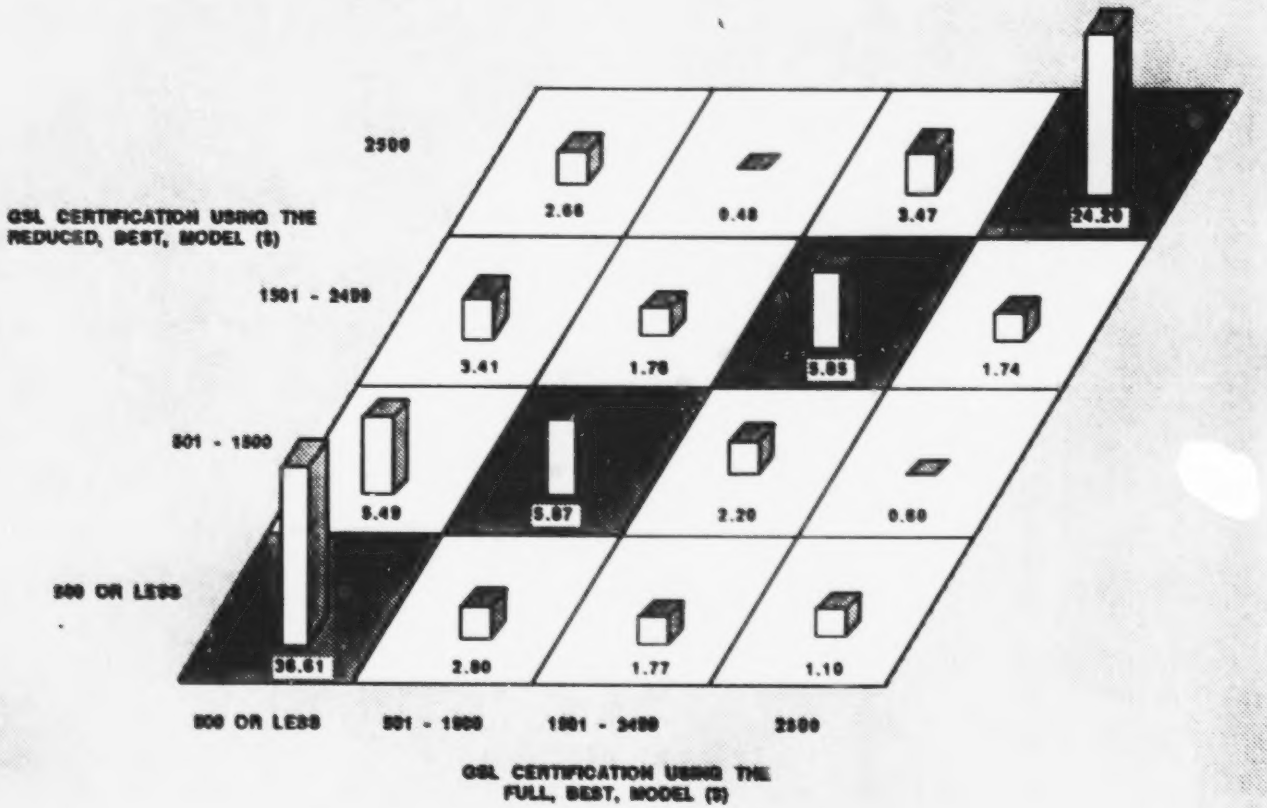

EXHIBIT 6-4. COMPARISON OF GSL CERTIFICATION UNDER FULL AND REDUCED UM MODELS USING BEST DATA FOR UNDERGRADUATE STUDENTS (PERCENTAGE BLOCK CHART)

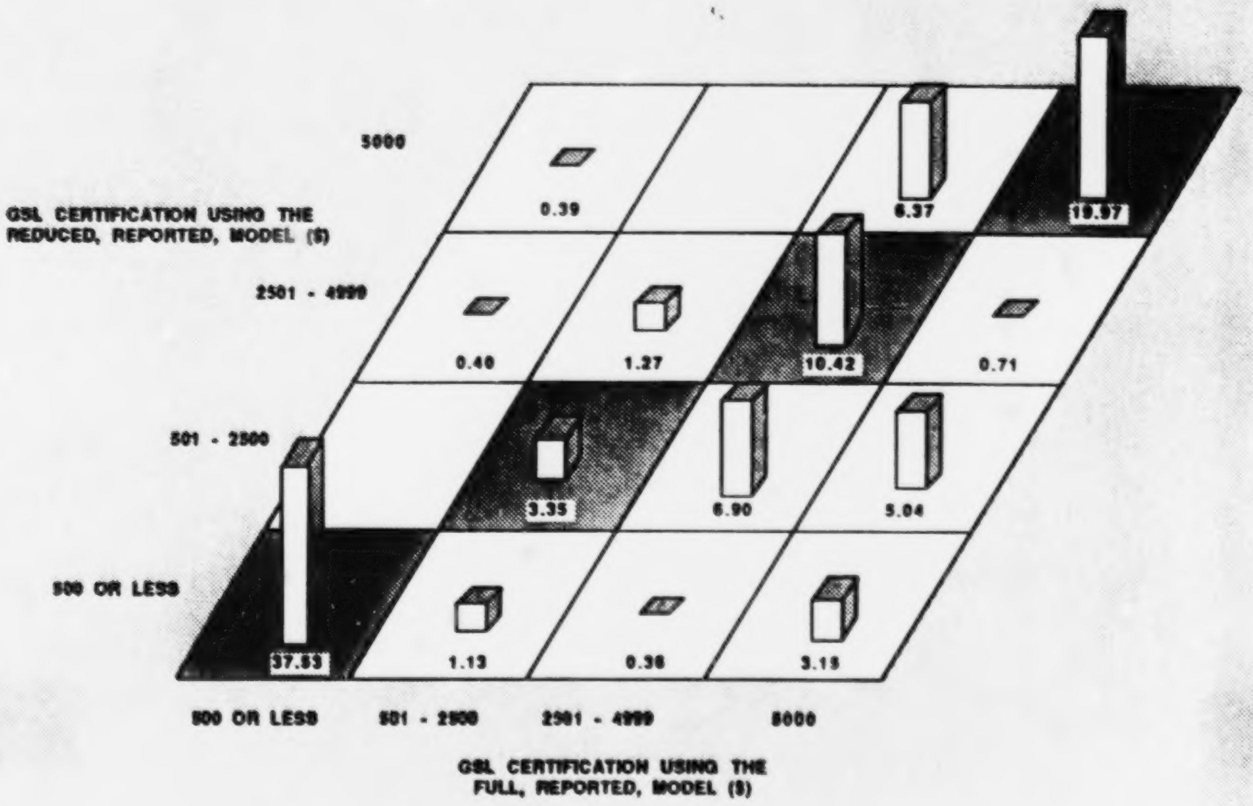

EXHIBIT 6-5. COMPARISON OF GSL CERTIFICATION UNDER FULL AND REDUCED UM MODELS USING REPORTED DATA FOR GRADUATE STUDENTS (PERCENTAGE BLOCK CHART)

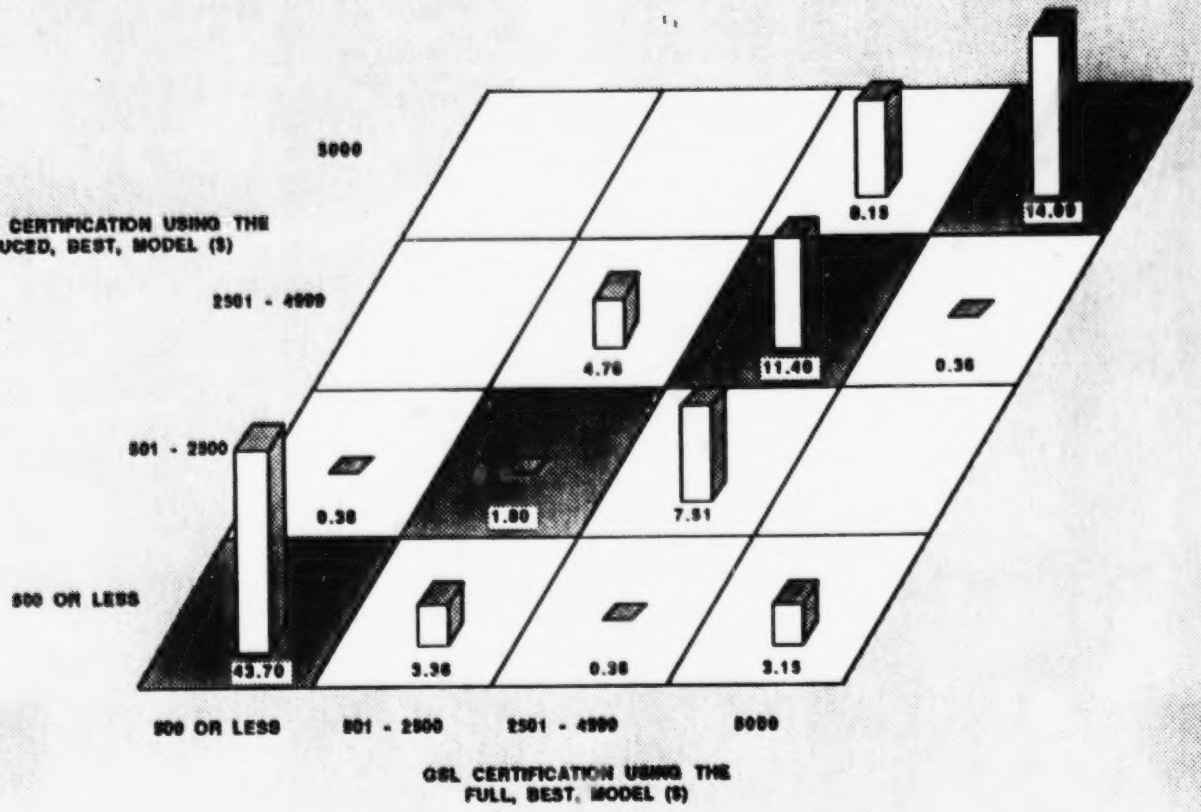

EXHIBIT 6-6. COMPARISON OF GSL CERTIFICATION UNDER
FULL AND REDUCED UM MODELS USING BEST DATA
FOR GRADUATE STUDENTS
(PERCENTAGE BLOCK CHART)

with increased certification, 64 percent increased to the full amount ($5,000) from a certification of $2,501 to $4,999.

6.4.3 Student Certification Error Under the GSL Models

Table 6-11 summarizes the effects of student misreporting on GSL certification under the full and reduced formulae. The overcertification rate under the reduced formula is less than half that under the full formula. Overcertifications total $1,302.6 million under the full formula and $506.8 under the reduced formula, a difference of $795.8 million. These figures indicate that GSL certification is less sensitive to student misreporting under the reduced formula than under the full formula.

6.4.4 Conclusions of GSL Alternatives

Like the effects of the reduced formula in the Campus-Based programs, the effects in the GSL program suggest that reducing the UM formula has promise in increasing the accuracy of determining certifications in the GSL program. The distribution of certifications under the reduced formula approximated the intended distribution very closely. In addition, the effects on certification for both graduate and undergraduate students is such that most students receive nearly the same certification under the reduced formula. Finally, student error under the reduced formula is significantly lower than under the full formula.

TABLE 6-11

GSL STUDENT CERTIFICATION ERROR* UNDER THE FULL AND REDUCED FORMULAE, 1985-86

	NO ERROR	OVERCERTIFICATIONS		
	(Within $50) Percent	Percent	Mean	Total** ($ Millions)
Full Formula	69.1	30.9	1,204	1,302.6
Reduced Formula	85.7	14.3	1,014	506.8

* All recipients go through need analysis, and no prospective income used.

** Due to a revision in the estimate of total GSL loan volume, these figures should be reduced by approximately 10 percent.

6.5 CONCLUSIONS

Shortening the UM formula shows promise in increasing the accuracy and efficiency of determining need in Campus-Based programs[1]. The distribution of need under a reduced formula overcomes, to a degree, the distortions from the intended distribution caused by student reporting error. The distribution of need under the reduced formula appears especially attractive since the target group of recipients, those in the lowest income groups for independent and dependent recipients, gain in need relative to the other income groups.

Like the effects of the reduced formula in the Campus-Based programs, the effects in the GSL program suggest that reducing the UM formula has promise in increasing the accuracy of determining certifications. The distribution of certifications under the reduced formula approximated the intended distribution very closely. In addition, the effects on certification for both graduate and undergraduate students is such that most students receive nearly the same certification under the reduced formula. Finally, GSL student error under the reduced formula is significantly lower than under the full formula.

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[1] Similar analysis of data element reduction for the Pell Grant program completed in Stage One also showed encouraging results.

Simplification involves many aspects other than just the formulae. Simplification also includes the structure of the delivery system as well as changing the focus of quality assurance activities from process-oriented activities to results-oriented requirements. These activities focus on aspects of the delivery system that cause problems Title IV-wide. A separate volume for this study, Delivery System Quality Improvements, explores these aspects more deeply.

In summary, corrective actions taken to date have achieved some success in reducing error, but high levels of residual error remain. This volume has presented analyses of some current and potential corrective actions aimed at first, making continued improvements in quality through expedient, short-term activities and finally, making major improvements in quality through changes in procedures, data, and levels of authority and accountability. It is hoped that ED and other stake holders will join the challenge in improving the quality and equity of student financial aid delivery.

APPENDIX A

DERIVATION OF ROOT MEAN SQUARED DIFFERENCE

In comparing pairs of models, it is convenient to develop a measure of distance between models. The Root Mean Squared Difference is an adjusted measure of distance useful in comparing pairs of models. The derivation of this measure is described below.

The Sum of Squared Differences (SSD) is calculated by summing the squared difference in need (or certification) between two models over all recipients. The Mean Squared Difference (MSD) is the quotient of the SSD and the number of recipients. Root Mean Squared Difference (RMSD) is the square root of the MSD.

$$SSD = \sum_{i=1}^{n} (X_{1i} - X_{2i})^2$$

where X_{1i} is the need under the first model for recipient i
X_{2i} is the need under the second model for recipient i
n is the number of recipients

$$MSD = SSD/n$$

$$RMSD = \sqrt{MSD}$$

An alternative measure of closeness is the Mean Absolute Difference (MAD).

$$MAD = (1/n) \left[\sum_{i=1}^{n} |X_{1i} - X_{2i}| \right]$$

The Root Mean Squared Difference is a more desirable measure because larger differences are weighted more heavily than smaller differences. Since the detection of large changes is important, the RMSD is the better measure.

APPENDIX B

The tables in this appendix provide information on how prospective and base year models affect recipients in the Pell and Campus-Based programs. The tables presented are cross-tabulations of awards (Pell program) or need (Campus-Based programs), by amount of award or need, using best and reported data in the prospective and base year income models. The tables supplement the exhibits in Chapter 3.

TABLE B-1

```
   COMPARISON OF CAMPUS-BASED NEED UNDER PROSPECTIVE AND BASE-YEAR MODELS
                          USING REPORTED DATA

                      TABLE OF PRND_RC BY PRND_RN

PRND_RC   REPORTED PROSPECTIVE   PRND_RN   REPORTED BASE-YEAR

FREQUENCY    |
PERCENT      |
ROW PCT      |
COL PCT      |200 OR L|201 - 10|1001 - 2|2501 - 5|OVER 500|
             |ESS     |00      |500     |000     |0       |  TOTAL
-------------+--------+--------+--------+--------+--------+
200 OR LESS  |     45 |      6 |      5 |      2 |      3 |     61
             |   8.20 |   1.09 |   0.91 |   0.36 |   0.55 |  11.11
             |  73.77 |   9.84 |   8.20 |   3.28 |   4.92 |
             |  45.92 |  13.04 |   4.39 |   1.33 |   2.13 |
-------------+--------+--------+--------+--------+--------+
201 - 1000   |     16 |     17 |      5 |      5 |      4 |     47
             |   2.91 |   3.10 |   0.91 |   0.91 |   0.73 |   8.56
             |  34.04 |  36.17 |  10.64 |  10.64 |   8.51 |
             |  16.33 |  36.96 |   4.39 |   3.33 |   2.84 |
-------------+--------+--------+--------+--------+--------+
1001 - 2500  |     20 |     12 |     57 |     14 |      6 |    109
             |   3.64 |   2.19 |  10.38 |   2.55 |   1.09 |  19.85
             |  18.35 |  11.01 |  52.29 |  12.84 |   5.50 |
             |  20.41 |  26.09 |  50.00 |   9.33 |   4.26 |
-------------+--------+--------+--------+--------+--------+
2501 - 5000  |     13 |      9 |     35 |    102 |      9 |    168
             |   2.37 |   1.64 |   6.38 |  18.58 |   1.64 |  30.60
             |   7.74 |   5.36 |  20.83 |  60.71 |   5.36 |
             |  13.27 |  19.57 |  30.70 |  68.00 |   6.38 |
-------------+--------+--------+--------+--------+--------+
OVER 5000    |      4 |      2 |     12 |     27 |    119 |    164
             |   0.73 |   0.36 |   2.19 |   4.92 |  21.68 |  29.87
             |   2.44 |   1.22 |   7.32 |  16.46 |  72.56 |
             |   4.08 |   4.35 |  10.53 |  18.00 |  84.40 |
-------------+--------+--------+--------+--------+--------+
TOTAL              98       46      114      150      141      549
                17.85     8.38    20.77    27.32    25.68   100.00
```

TABLE B-2

COMPARISON OF CAMPUS-BASED NEED UNDER PROSPECTIVE AND BASE-YEAR MODELS USING BEST DATA

```
                         TABLE OF PRND_BC BY PRND_BN

PRND_BC   BEST PROSPECTIVE   PRND_BN   BEST BASE-YEAR

FREQUENCY    |
 PERCENT     |
 ROW PCT     |
 COL PCT     |200 OR L|201 - 10|1001 - 2|2501 - 5|OVER 500|
             |ESS     |00      |500     |000     |0       |  TOTAL
-------------+--------+--------+--------+--------+--------+
200 OR LESS  |     64 |      6 |     10 |     11 |      7 |     98
             |  11.66 |   1.09 |   1.82 |   2.00 |   1.28 |  17.85
             |  65.31 |   6.12 |  10.20 |  11.22 |   7.14 |
             |  51.20 |  12.24 |   9.80 |   7.59 |   5.47 |
-------------+--------+--------+--------+--------+--------+
201 - 1000   |     16 |     16 |      5 |      8 |      3 |     48
             |   2.91 |   2.91 |   0.91 |   1.46 |   0.55 |   8.74
             |  33.33 |  33.33 |  10.42 |  16.67 |   6.25 |
             |  12.80 |  32.65 |   4.90 |   5.52 |   2.34 |
-------------+--------+--------+--------+--------+--------+
1001 - 2500  |     24 |     18 |     48 |     21 |      8 |    119
             |   4.37 |   3.28 |   8.74 |   3.83 |   1.46 |  21.68
             |  20.17 |  15.13 |  40.34 |  17.65 |   6.72 |
             |  19.20 |  36.73 |  47.06 |  14.48 |   6.25 |
-------------+--------+--------+--------+--------+--------+
2501 - 5000  |     18 |      8 |     33 |     83 |     19 |    161
             |   3.28 |   1.46 |   6.01 |  15.12 |   3.46 |  29.33
             |  11.18 |   4.97 |  20.50 |  51.55 |  11.80 |
             |  14.40 |  16.33 |  32.35 |  57.24 |  14.84 |
-------------+--------+--------+--------+--------+--------+
OVER 5000    |      3 |      1 |      6 |     22 |     91 |    123
             |   0.55 |   0.18 |   1.09 |   4.01 |  16.58 |  22.40
             |   2.44 |   0.81 |   4.88 |  17.89 |  73.98 |
             |   2.40 |   2.04 |   5.88 |  15.17 |  71.09 |
-------------+--------+--------+--------+--------+--------+
TOTAL             125       49      102      145      128      549
                22.77     8.93    18.58    26.41    23.32   100.00
```

TABLE B-3

ALTERNATIVE DEPENDENT INCOME MODELS IN THE PELL PROGRAM FOR RECIPIENTS WITH PROSPECTIVE INCOME LESS THAN 60 PERCENT OF BASE YEAR INCOME

TABLE OF AND_RN BY AND_RO

AND_RN   REDEFINED REPORTED   AND_RO   CURRENT REPORTED

FREQUENCY PERCENT ROW PCT COL PCT	NONE	$750 OR LESS	$751 - $1,250	$1,251 - $1,750	$1,751 - $2,099	$2,100	TOTAL
NONE	1115 0.15 0.99 100.00	49847 6.85 44.42 25.10	35157 4.83 31.33 19.62	23370 3.21 20.83 10.08	835 0.11 0.74 1.28	1894 0.26 1.69 3.66	112218 15.42
$750 OR LESS	0 0.00 0.00 0.00	148743 20.45 93.87 74.90	2231 0.31 1.41 1.25	6358 0.87 4.01 2.74	1118 0.15 0.71 1.72	0 0.00 0.00 0.00	158451 21.78
$751 - $1,250	0 0.00 0.00 0.00	0 0.00 0.00 0.00	141760 19.49 92.81 79.13	10503 1.44 6.88 4.53	471 0.06 0.31 0.73	0 0.00 0.00 0.00	152734 20.99
$1,251 - $1,750	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	191707 26.35 98.02 82.65	3881 0.53 1.98 5.97	0 0.00 0.00 0.00	195588 26.88
$1,751 - $2,099	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	58649 8.06 97.97 90.29	1217 0.17 2.03 2.35	59865 8.23
$2,100	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	48670 6.69 100.00 93.99	48670 6.69
TOTAL	1115 0.15	198590 27.30	179148 24.62	231939 31.88	64953 8.93	51781 7.12	727526 100.00

TABLE B-4

ALTERNATIVE DEPENDENT INCOME MODELS IN THE PELL PROGRAM FOR RECIPIENTS WITH PROSPECTIVE INCOME LESS THAN 60 PERCENT OF BASE YEAR INCOME

```
                           TABLE OF AWD_BN BY AWD_BO

AWD_BN     REDEFINED BEST   AWD_BO     CURRENT BEST

FREQUENCY        |
 PERCENT         |
 ROW PCT         |
 COL PCT         |NONE    |$750 OR |$751 - $|$1,251 -|$1,751 -|$2,100  |  TOTAL
                 |        |LESS    |1,250   | $1,750 | $2,099 |        |
-----------------+--------+--------+--------+--------+--------+--------+
NONE             |  58550 |  39222 |  24556 |  17123 |   6931 |   2888 | 149270
                 |   8.05 |   5.39 |   3.38 |   2.35 |   0.95 |   0.40 |  20.52
                 |  39.22 |  26.28 |  16.45 |  11.47 |   4.64 |   1.93 |
                 |  94.53 |  22.25 |  14.90 |   8.06 |  11.47 |   5.58 |
-----------------+--------+--------+--------+--------+--------+--------+
$750 OR LESS     |   2438 | 135987 |   6102 |   4172 |   1223 |      0 | 149923
                 |   0.34 |  18.69 |   0.84 |   0.57 |   0.17 |   0.00 |  20.61
                 |   1.63 |  90.70 |   4.07 |   2.78 |   0.82 |   0.00 |
                 |   3.94 |  77.14 |   3.70 |   1.97 |   2.02 |   0.00 |
-----------------+--------+--------+--------+--------+--------+--------+
$751 - $1,250    |    952 |   1079 | 133649 |  17589 |   1642 |      0 | 154910
                 |   0.13 |   0.15 |  18.37 |   2.42 |   0.23 |   0.00 |  21.29
                 |   0.61 |   0.70 |  86.27 |  11.35 |   1.06 |   0.00 |
                 |   1.54 |   0.61 |  81.11 |   8.28 |   2.72 |   0.00 |
-----------------+--------+--------+--------+--------+--------+--------+
$1,251 - $1,750  |      0 |      0 |      0 | 170652 |    821 |   1314 | 172787
                 |   0.00 |   0.00 |   0.00 |  23.46 |   0.11 |   0.18 |  23.75
                 |   0.00 |   0.00 |   0.00 |  98.76 |   0.48 |   0.76 |
                 |   0.00 |   0.00 |   0.00 |  80.37 |   1.36 |   2.54 |
-----------------+--------+--------+--------+--------+--------+--------+
$1,751 - $2,099  |      0 |      0 |    471 |   2800 |  49787 |   1024 |  54082
                 |   0.00 |   0.00 |   0.06 |   0.38 |   6.84 |   0.14 |   7.43
                 |   0.00 |   0.00 |   0.87 |   5.18 |  92.06 |   1.89 |
                 |   0.00 |   0.00 |   0.29 |   1.32 |  82.42 |   1.98 |
-----------------+--------+--------+--------+--------+--------+--------+
$2,100           |      0 |      0 |      0 |      0 |      0 |  46555 |  46555
                 |   0.00 |   0.00 |   0.00 |   0.00 |   0.00 |   6.40 |   6.40
                 |   0.00 |   0.00 |   0.00 |   0.00 |   0.00 | 100.00 |
                 |   0.00 |   0.00 |   0.00 |   0.00 |   0.00 |  89.91 |
-----------------+--------+--------+--------+--------+--------+--------+
TOTAL               61939   176288   164778   212335    60405    51781   727526
                     8.51    24.23    22.65    29.19     8.30     7.12   100.00
```

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APPENDIX C

The following paper is reprinted with the permission of the National Association of Student Financial Aid Administrators (NASFAA). The paper has been drafted as a working document and is intended to generate discussion on the subject of need analysis reform. Hence, the paper does not represent the final position of NASFAA on the topic of need analysis reform, and should not be interpreted as such.

NEED ANALYSIS: THOUGHTS FOR REFORM
A Report of the NASFAA Need Analysis Standards Committee

INTRODUCTION

The NASFAA Need Analysis Standards Committee (NASC) is representative of all sectors of NASFAA membership. The Committee's responsibility to membership is to review, discuss and evaluate all aspects of need analysis with regard to financial aid administration, and to make recommendations to National Council on the basis of such review and evaluation.

The 1984-85 Need Analysis Standards Committee began discussions which suggested the concept of need analysis should be examined as a whole, rather than reviewed for annual updates. Committee membership for 1985-86 remained the same in order to facilitate continued discussion and development of specific recommendations to National Council with regard to a review of need analysis standards as they exist currently.

This report is a result of the discussions of those two years. It is intended to provide a basis for proactive input which will result in a strategy to effectively distribute financial aid funds from all sources to all applicants. It is a document driven by the need to form consensus around complex issues and should be received in that context.

BACKGROUND

Need Analysis was the term originally applied narrowly in the financial aid community to the process of evaluating financial need for funds controlled by the institution. Need analysis now broadly applies also to processes used for program eligibility determination beyond direct control of the institutional aid administrator, such as eligibility for Pell Grants or Guaranteed Student Loans. The expansion of the definition to address program eligibility issues has confounded discussion of the system. Because more and varied publics are impacted by the need analysis system, there is a broad interest in its design and output.

The system began when private agencies designed and implemented a method of need analysis for institutional purposes. It was later used for determining federal campus-based awards. This was followed by the federal government designing and implementing another method and procedures for Pell Grant (then BEOG) application and eligibility purposes. The Guaranteed Student Loan (GSL) program was subject to yet another system for determining need.

In an effort to reduce the duplicative efforts of Pell processing and the standard application for federal campus-based programs, a common set of data elements was developed. Questions needed for both Pell Grant determination and the financial need evaluation for campus based aid are now on one form, the common form for "multiple data entry" (MDE).

The development of multiple data entry was intended to better serve all users of the need analysis system. Simultaneously, processors agreed on the concept of uniform methodology. An alternative system of need, based on adjusted gross income charts, was retained for students applying for GSL.

The use of one form reduced paperwork for the majority of aid filers, but the reporting of information once did not mean that the information was used the same way for all aid award determinations. Program regulations and funding levels continue to dictate, to some extent, how financial need is defined. One design model is attempting to serve all interested parties.

Families completing one form are often unaware that they will demonstrate financial need for one program and not another. While they are most concerned with the translation of all the systems into how much money they will receive, they often become frustrated in trying to determine why one form does not mean one system of need determination or eligibility for aid.

Development and use of the common form was positive for financial aid filers and aid administrators. However, with the exception of the minimum contribution from taxable income (MCTI) concept, there have been no major changes in the way family financial information is collected and analyzed in recent years. Instead, the current system has been reviewed and modified annually with little substantive change. Components of current need analysis have been studied in depth over the years, but the financial aid community in general has not considered such basic issues as:

- Is the current need analysis system the most effective?
- What components are necessary for determining a family's ability to pay for educational costs?
- What does a reasonable method of need analysis require and generate?

Consideration of these questions does not become less important with need analysis guidelines being incorporated into law. Need analysis standards dictated in legislation remove many of the consensus options, but need analysis remains a professional issue deserving a public forum. The Need Analysis Standards Committee recognizes the different opinions held by NASFAA members. Certain factions want more information from filers, some want less. The aid community overall is concerned with verification and the best way to achieve good information. These concerns are signs of a need analysis system that needs a thorough review.

The Need Analysis Standards Committee has attempted to review the current system and to propose more useful and less cumbersome methods for defining where we want to be. The following ideas are an attempt to design a coherent whole based on rational pieces. Considerations for change to the current need analysis system are presented through the context of strategic planning, simplicity, face validity, and some seemingly untouchable principles of need analysis arising from historical presumptions. The format shares with the reader the questions and concerns debated by the committee and offers a committee view as a result of the debate.

The presentation of these considerations for need analysis reform is not meant to be all-inclusive. It offers no specific revised formulas, taxation rates, or mathematical calculations. It is a reaction to questions raised when one moves away from the detail and examines the following points: 1.) public perception, 2.) consumer response, 3.) what is realistic, and 4.) what is essential.

SIMPLICITY

The current application system suggests simplicity because one form is utilized to serve several purposes. However, completion of the single form is not simple. Families must work their way through detailed instructions, numbered and color-coded sections, code lists, tax forms, and income and asset valuations, and then agree, through required signatures and release statements, to verify all information they have provided. Aid administrators receive an analysis of the information and review it. The review often reveals questionable information which requires further contact with the family and possible corrections. The review and correction cycles continue until information received agrees with tax returns or other documentation and appears valid within parameters not necessarily established by the aid office.

Thus, it appears need analysis is not a simple process from any perspective. Families, aid administrators, processors, the federal government, and related education organizations are all entities involved in the system. Consensus building through a committee of all parties concerned has guided design of the current system in application and process and the annual changes.

The issue of simplicity must be brought to the forefront in developing a system to accomplish the purpose of need analysis. Would a system simpler for all users to understand result in greater accuracy? One viewpoint suggests requesting more information than is now required in the pursuit of accuracy. Another viewpoint, in the same pursuit, suggests a move to collect less detailed information. These are not mutually exclusive views. They are both important to consideration of change in need analysis. It should also be acknowledged that complexity does not necessarily ensure equity, nor is fairness guaranteed by endless, complicated revision. The aid community should be moving in the direction of accuracy with simplicity, not accuracy or simplicity.

In our efforts to deliver dollars for education, barriers which discourage participation by educationally, financially, or socially disadvantaged consumers should be removed. Our requests for data should be reasonable for all consumers. The need analysis system should protect and encourage access, and offer a fair measure of ability to pay for all filers based only on data determined essential to that effort.

The NASC has been sensitive to the varied opinions in the aid community, yet believes compromise on the issue of accuracy with simplicity must be reconciled as an overall objective. The current application forms require responses to more than 70 items related to financial matters if the family submits a complete application with supporting detail. Requests for more information beyond the 70-plus are not uncommon.

Issues debated included: At what point do we have enough information? At what income level does any extra financial resource make a difference in the estimated or realistic ability to pay? Must all applicants be directed through questions that do not apply to all? What is gained or lost by the degree of detail now in use? Is calculated ability to pay a search for an exact dollar amount, or would an estimate within ranges serve just as well?

Is it possible for fewer questions about financial matters to provide an acceptable estimate of ability to pay? At what point does requested data become an intolerable burden to the public? What specific data elements are significant in affecting and measuring ability to pay? If income items alone will provide a reasonable estimate, is it necessary to do extensive analysis of assets?

GENERAL OBJECTIVE: The need analysis process should make delivery of multiple resources as simple and expeditious as possible for all users of the system.

Specific Goals:

1. The application and instructions for collecting necessary data elements should be designed to be understood at the sixth grade reading level. The application should take approximately thirty minutes for the average filer to complete.
2. Information requested for the necessary data elements should be readily available to the family and easily verified.
3. The calculation of ability to pay through treatment of data elements should be simple enough to be comfortably performed manually by aid administrators, guidance counselors, parents, students, and auditors.
4. A simple, single application and correction process should provide prompt results.
5. The system should be designed to accommodate new technologies with simple input and output.
6. The application should promote accurate reporting of information with less complex, more straightforward approaches.
7. The system should be designed to serve all programs, populations, and users.

FACE VALIDITY

Not far removed from simplicity is the concern for face validity in the results of the application. Families sharing sensitive income and asset information may worry about where the information goes and what is done to it. The aid community offers the assurance of confidentiality, but has access to information beyond that provided to the Internal Revenue Service. It would not be surprising that families may have a wary attitude about the process and its results.

The aid administrator is the frontline defense in explaining institutional aid policy and federal program eligibility. The campus aid administrator is the human element in a seemingly mechanized process and is therefore expected to provide logical answers to questions regarding the process and results. It is in that one-on-one contact with families that face validity is important. Families with general economic or cash flow problems are often stunned to hear verbalized theories of need analysis which have little relation to their real problems of immediate access to funding for educational expenses. The system of need analysis has not created this effect by itself, but the current system has created a situation in which provision of such detailed information can be interpreted by families as clear representation of why financial help is needed and why they deserve assistance. This attitude covers the economic spectrum.

As the aid community experiences more applications from all income and asset levels, it becomes increasingly difficult to offer a rational explanation of the system in all instances. The sophistication of the information intimidates those from the lower socioeconomic levels and makes it possible for the wiser clientele to express difficulty in providing the expected family contribution. Some families approach the process with the attitude that the system can and should be manipulated to one's advantage because they do not believe in its accuracy in reflecting their situation. A variety of organizations openly advertise seminars describing methods for manipulating asset and income information to ensure maximum aid eligibility. The aid community does not condone that manipulation, but it is a reality that impacts face validity. The system should not set up false expectations nor should it be so complicated as to foster a belief that every single financial aspect has been considered and duly judged.

The aid community views processing and need determination more in the aggregate, whereas the individual family perspective is one of a sincere personal issue. From the family perspective, if the aid administrator is able to provide a good financial aid package, the system works. If the aid package does not recognize family expectations based on their perception of a realistic contribution on their part, the system, and possibly the aid administrator, are under suspicion. Families confused about the complexity, and wary of the validity, are then expected to comprehend the explanations of program eligibility, funding restrictions, and remaining options.

Questions debated include: Is it appropriate to continue calculating elementary/secondary tuition allowances in the system? As our population ages, what about eldercare? What is appropriate treatment of IRA/Keogh funds in need analysis when families are publicly encouraged to participate and plan their own retirement? What is appropriate for pension fund

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calculations given those benefits are not easily identified and may in fact be reduced or cancelled? What is appropriate treatment of self employment tax? What is or should be the financial treatment for stepchildren and stepparent information? Do current asset calculations prove necessary and essential in calculating current ability to pay?

Again, the committee understands the logic and rationale offered by aid administrators for the pro or con stance on any of the questions, but points out that any final resolutions must survive face validity to the public. The responses we provide must answer real concerns, not theoretical case studies. The extremes - millionaire or public assistance recipient - will always be the exception to any general financial scheme. The need analysis system must accommodate the majority, recognize that no system will be perfect, and accept tolerable compromises in the overall picture.

Credibility and validity must be restored in all aspects of need analysis. Calculation of ability to pay is unrealistic in the minds of many people. Fairness and equity must come from straightforward, easily understood approaches to gathering needed information.

GENERAL OBJECTIVE: Need analysis should represent a realistic system which estimates an ability to pay seen as reasonable by all constituents.

Specific Goals:

1. The system must realistically reflect how families actually pay for higher education costs.

2. The system should emphasize current income calculations and move away from detailed use of asset data in calculation of ability to pay if it can be proven that assets do not bear a significant relationship to actual contributions.

3. Estimated information, which cannot be verified, should not be used.

4. The system must recognize the various family structures impact ability to pay.

5. The process should reinforce the primary role of the family in financing postsecondary education.

6. The system must distinguish between discretionary and nondiscretionary income and expenses and the use of those items in estimating family contribution.

7. The system should be reviewed by economists and financial experts to ensure it is based on a foundation of accepted economic principles which recognize current realities.

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8. The methodology for determining financial need should not be used as a rationing device.

9. The aid administrator's use of professional judgment should be encouraged, but the system should be designed to eliminate the need for a large number of adjustments.

10. The aid administrator's ability to provide time for personal and professional interaction with families should be restored through use of a simple, easily-explained system.

HISTORICAL PRESUMPTIONS

Change by definition disrupts the status quo. The current need analysis system contains elements that have served well, but may have been implemented under conditions which no longer exist.

It may be wise to step away from the detail of the current system to decide if it is accomplishing its purpose. Should all components of the current system be preserved? Should need analysis calculate an exact dollar amount a family should contribute to education when, in fact, costs of education are estimated? Is there a method for determining acceptable estimates? Does the use of both income and asset information result in a significantly more accurate ability to pay?

The answers to these questions and others dictate the approach the need analysis system takes in collecting and analyzing family financial data. Some established principles of determining ability to pay may no longer have the validity required to merit continuation. As an example, contributions from assets may indeed reflect differences in family economic strength, but may not reflect a directly proportional difference in ability to pay. Similarly, the lack of recognition of consumer debts may not realistically portray a family's ability to provide money for college costs. At a minimum, these points require examination.

The committee recognizes the impact change may mean for all parties involved, but change should not be evaded simply to avoid disruption. If the end result is more honest, more straightforward, and survives public scrutiny with less disdain, the disruption was merited.

The economy, financing mechanisms, credit structures, savings plans, and tax issues have had significant impact on the American public. Changes to the tax structure may create or eliminate family financial planning options. Calculations of ability to pay for education must function within economic realities of the United States and, in particular, must deal with the realities facing families as consumers of postsecondary education opportunities.

GENERAL OBJECTIVE:	All aspects of the data used in need analysis should be subjected to evaluation for appropriateness to the purpose of the system.

Specific Goals:

1. Income is assumed to be central to the calculation of ability to pay and should be recognized as such in need analysis.
2. Savings for postsecondary education expenses should be encouraged by the need analysis system.
3. An assessment procedure for the non-saver should be explored.
4. Allowances for expenses and assessable income must stand a reasonable public test for all constituents.

STRATEGIC PLANNING

Change has become a recognized and accepted reality in financial aid administration. Much of the change, though, has not resulted from long range thinking. It has been an evolution motivated by reaction to perceived inequities and the identification of specific problems. Such ad hoc changes may reflect weaknesses in a system without direction or structure for planning change.

It is appropriate and timely for the aid community to initiate a plan that outlines and confirms a specific direction. Annual changes respond to immediate problems but do not necessarily indicate progress toward a specific goal. The continued debate on separate issues within need analysis can be minimal if a long-range plan is in place. A plan implies stability, consistency, and implementation of common goals. A plan for change also provides objectives from which success can be measured.

The aid community publicly encourages families to plan for education. Does the aid community know its own plan? In theory, families should know how much they will be expected to contribute to college costs far enough in advance to permit thoughtful planning. Financial aid administrators should be able to assist that family endeavor. A plan for the components in need analysis and subsequent analysis of data for more than a twelve month period of time would be a move toward stability and predictability. The annual debate on what items remain, what gets changed, and what gets added to need analysis reflect the lack of an overall plan. Is it possible to focus on necessary components, decide on appropriate treatment in the methodology, and subsequently apply annual economic updates?

Families deserve to see consistency in treatment of information from one year to the next. The aid community should be able to explain the need methodology with more assurance than we now possess.

Initiation of a plan will necessarily force difficult decisions. The choices in the end may not result in more of the same or less of the same. The problems brought to light may require an entirely new solution. If the aid community itself has no plan, some other entity will design one. Strategic planning means the right questions are raised and thoughtful, responsive answers surface as objectives.

In order to develop a long-range plan for need analysis, the aid community must determine the basis on which such a plan can be completed. Determination of that basis requires identification of primary objectives of need analysis. Only by having identified the purpose can a strategic plan for need analysis be developed.

GENERAL OBJECTIVE: A plan for the development, implementation, and enhancement of a need analysis system to realistically predict family contribution toward educational costs must be produced.

Specific Goals:

1. The plan will be written for a three to five year time frame.
2. The plan must be sensitive to demographic changes in the population to be served by federal, state, and institutional aid programs.
3. The plan must be based on generally accepted standards of the aid community in assessing the family's ability to pay.
4. The plan should provide flexibility for change in a systematic, non-disruptive manner for financial aid filers and aid administrators.
5. Basic components of the plan should be available to all publics served by the need analysis process.

CONCLUSION

The need analysis system does not operate alone in the delivery of student aid, but it can become a more effective part of that delivery. Families want to know what will be required of them and what results they can expect. The aid community wants to deliver money to deserving students effectively. Congress and the taxpayer may be significantly more supportive if they see that prudence and common sense are among goals of aid professionals. Judicious stewardship of public and private funds demands that our distribution system survive the "reasonable man" test. The issues of simplicity, face validity, fairness, and planning are foundations on which to build. The need analysis system should be a rational, separate part of the financial aid process. If it is a rational piece of the whole, issues related to program eligibility, rationing, timing, verification, and delivery of dollars can be more readily resolved and achieve their own validity. Each element of the financial aid system must attempt to become an integral part of a whole based on clearly stated objectives.

These issues are not resolved in this paper, but do represent thoughts and questions to be raised when a review of the current system is done. Is the "snapshot" still a viable approach? Should there be a distinction between types of assets when calculating the ability to pay? Is a contribution from income different from a contribution from assets? Is cashing in or borrowing against an asset to meet an expected contribution reasonable when economic conditions make such steps difficult? Is educational financing an annual event? Can long-term assurances of aid packages be made to encourage better family financial aid planning?

Is there a difference in ability to pay now and the ability to pay over-time? How are postsecondary education payments to be reconciled with current and past family debt commitments? Must the Pell Grant processor continue as is? Do we really have uniform methodology if institutionally determined variables impact the results? How can verification be simplified? Have the intricacies of the current system gone beyond the generally required expertise of the average aid administrator?

This paper is presented as a departure point for positive and constructive criticism of a system in need of review. The NASFAA Need Analysis Standards Committee members do not present it as an unreasonable criticism of where we are but a call for an extensive review of the concept of need analysis. The Committee seeks National Council endorsement of the concept of reform and hopes to see NASFAA submit these goals and objectives to other interested parties for comment. The move for future changes should be led by those professionals who deal with those most impacted by need analysis.

APPENDIX D

The tables in this appendix provide information on how full and reduced models affect recipients in the Campus-Based and GSL programs. The tables presented are cross-tabulations of need (Campus-Based programs) or certification (GSL programs), by amount of need on certification, using best and reported data in the full and reduced models. The tables supplement the exhibits in Chapter 6.

Table D-1

```
         COMPARISON OF CAMPUS-BASED NEED UNDER DIFFERENT MODELS

                    TABLE OF CNEED_FR BY CNEED_RR

CNEED_FR  FULL REPORTED   CNEED_RR  REDUCED REPORTED

FREQUENCY      |
 PERCENT       |
 ROW PCT       |
 COL PCT       |$200 OR |$201 - $|$1001 - |$2501 - |OVER $40|
               |LESS    |1000    |$2500   |$4000   |00      |  TOTAL
---------------+--------+--------+--------+--------+--------+
$200 OR LESS   | 146242 |  20708 |  34960 |  12300 |   4619 | 218865
               |  11.43 |   1.62 |   2.73 |   0.96 |   0.36 |  17.11
               |  66.84 |   9.46 |  15.97 |   5.62 |   2.11 |
               |  65.60 |  15.55 |   8.73 |   4.62 |   1.80 |
---------------+--------+--------+--------+--------+--------+
$201 - $1000   |  17445 |  64122 |  23274 |   6483 |      0 | 111324
               |   1.36 |   5.01 |   1.82 |   0.51 |   0.00 |   8.70
               |  15.67 |  57.60 |  20.91 |   5.82 |   0.00 |
               |   7.82 |  48.15 |   5.81 |   2.43 |   0.00 |
---------------+--------+--------+--------+--------+--------+
$1001 - $2500  |  24953 |  40028 | 252840 |  26143 |   6752 | 350716
               |   1.95 |   3.13 |  19.76 |   2.04 |   0.53 |  27.41
               |   7.11 |  11.41 |  72.09 |   7.45 |   1.93 |
               |  11.19 |  30.06 |  63.11 |   9.82 |   2.63 |
---------------+--------+--------+--------+--------+--------+
$2501 - $4000  |  12899 |   2709 |  76278 | 173457 |  34027 | 299370
               |   1.01 |   0.21 |   5.96 |  13.56 |   2.66 |  23.40
               |   4.31 |   0.90 |  25.48 |  57.94 |  11.37 |
               |   5.78 |   2.03 |  19.04 |  65.15 |  13.28 |
---------------+--------+--------+--------+--------+--------+
OVER $4000     |  21423 |   5600 |  13278 |  47869 | 210856 | 299025
               |   1.67 |   0.44 |   1.04 |   3.74 |  16.48 |  23.37
               |   7.16 |   1.87 |   4.44 |  16.01 |  70.51 |
               |   9.61 |   4.21 |   3.31 |  17.98 |  82.28 |
---------------+--------+--------+--------+--------+--------+
TOTAL            223032   133167   400630   266291   256250  1279300
                  17.43    10.41    31.32    20.81    20.03   100.00
```

Table D-2

```
            COMPARISON OF CAMPUS-BASED NEED UNDER DIFFERENT MODELS

                       TABLE OF CNEED_FR BY CNEED_RR

CNEED_FR  FULL REST   CNEED_RR  REDUCED REST

FREQUENCY       |
 PERCENT        |
 ROW PCT        |
 COL PCT        |$200 OR |$201 - $|$1001 - |$2501 - |OVER $40|
                |LESS    |1000    |$2500   |$4000   |00      |  TOTAL
----------------+--------+--------+--------+--------+--------+
$200 OR LESS    | 180771 |  34256 |  48175 |  28666 |   5148 | 297012
                |  14.13 |   2.68 |   3.77 |   2.24 |   0.40 |  23.22
                |  60.86 |  11.53 |  16.22 |   9.65 |   1.73 |
                |  72.56 |  26.00 |  12.49 |  11.01 |   2.04 |
----------------+--------+--------+--------+--------+--------+
$201 - $1000    |  28375 |  59604 |  39507 |   7523 |   7506 | 142515
                |   2.22 |   4.66 |   3.09 |   0.59 |   0.59 |  11.14
                |  19.91 |  41.82 |  27.72 |   5.28 |   5.27 |
                |  11.39 |  45.24 |  10.24 |   2.89 |   2.98 |
----------------+--------+--------+--------+--------+--------+
$1001 - $2500   |  14162 |  31064 | 239224 |  39124 |  13348 | 336922
                |   1.11 |   2.43 |  18.70 |   3.06 |   1.04 |  26.34
                |   4.20 |   9.22 |  71.00 |  11.61 |   3.96 |
                |   5.68 |  23.58 |  62.02 |  15.03 |   5.29 |
----------------+--------+--------+--------+--------+--------+
$2501 - $4000   |   7841 |   1564 |  47999 | 156237 |  27428 | 241069
                |   0.61 |   0.12 |   3.75 |  12.21 |   2.14 |  18.84
                |   3.25 |   0.65 |  19.91 |  64.81 |  11.38 |
                |   3.15 |   1.19 |  12.44 |  60.00 |  10.87 |
----------------+--------+--------+--------+--------+--------+
OVER $4000      |  17984 |   5251 |  10829 |  28839 | 198868 | 261782
                |   1.41 |   0.41 |   0.85 |   2.25 |  15.55 |  20.47
                |   6.87 |   2.01 |   4.14 |  11.02 |  75.97 |
                |   7.22 |   3.99 |   2.81 |  11.08 |  78.82 |
----------------+--------+--------+--------+--------+--------+
TOTAL             249113   131739   385734   260389   252298  1279100
                   19.47    10.30    30.15    20.35    19.72   100.00
```

Table D-3

```
           COMPARISON OF GSL CERTIFICATION UNDER DIFFERENT MODELS
                             UNDERGRADUATES

                       TABLE OF GCERT_FR BY GCERT_RR

GCERT_FR  FULL REPORTED    GCERT_RR  REDUCED REPORTED

FREQUENCY        |
PERCENT          |
ROW PCT          |
COL PCT          |$500 OR |$501 - $1|$1501 - |$2500    |
                 |LESS    |$1500    |$2499   |         |  TOTAL
-----------------+--------+---------+--------+---------+
$500 OR LESS     | 806623 | 136141  |  57219 |   46153 |1046136
                 |  26.00 |    4.39 |   1.84 |    1.49 |  33.73
                 |  77.10 |   13.01 |   5.47 |    4.41 |
                 |  66.90 |   28.67 |  12.16 |    4.86 |
-----------------+--------+---------+--------+---------+
$501 - $1500     | 164440 | 192879  |  44011 |   31975 | 433306
                 |   5.30 |    6.22 |   1.42 |    1.03 |  13.97
                 |  37.95 |   44.51 |  10.16 |    7.38 |
                 |  13.64 |   40.61 |   9.35 |    3.36 |
-----------------+--------+---------+--------+---------+
$1501 - $2499    |  84420 |  77513  | 208715 |   73368 | 444093
                 |   2.71 |    2.50 |   6.73 |    2.37 |  14.33
                 |  19.01 |   17.45 |  46.90 |   16.51 |
                 |   7.00 |   16.32 |  44.34 |    7.72 |
-----------------+--------+---------+--------+---------+
$2500            | 149791 |  68393  | 160785 |  798084 |1177553
                 |   4.83 |    2.21 |   5.18 |   25.75 |  37.97
                 |  12.71 |    5.81 |  13.65 |   67.83 |
                 |  12.42 |   14.40 |  34.16 |   84.06 |
-----------------+--------+---------+--------+---------+
TOTAL             1205656   474921    470730    950540   3101847
                    38.87    15.31     15.18     30.64    100.00
```

Table D-4

```
          COMPARISON OF GSL CERTIFICATION UNDER DIFFERENT MODELS
                            UNDERGRADUATES

                     TABLE OF GCERT_FR BY GCERT_RR

GCERT_FR  FULL REST   GCERT_RR  REDUCED REST

FREQUENCY       |
 PERCENT        |
 ROW PCT        |
 COL PCT        |$500 OR |$501 - $|$1501 - |$2500   |
                |LESS    |1500    |$2499   |        |  TOTAL
----------------+--------+--------+--------+--------+
$500 OR LESS    |1135311 | 170196 | 105651 |  82439 |1493597
                |  36.61 |   5.49 |   3.41 |   2.66 |  48.16
                |  76.01 |  11.40 |   7.07 |   5.52 |
                |  86.54 |  38.76 |  26.71 |   8.63 |
----------------+--------+--------+--------+--------+
$501 - $1500    |  86865 | 182048 |  54462 |  14900 | 338271
                |   2.80 |   5.87 |   1.76 |   0.48 |  10.91
                |  25.68 |  53.82 |  16.10 |   4.40 |
                |   6.62 |  41.46 |  13.77 |   1.56 |
----------------+--------+--------+--------+--------+
$1501 - $2499   |  54905 |  68272 | 181561 | 107710 | 412392
                |   1.77 |   2.20 |   5.85 |   3.47 |  13.30
                |  13.31 |  16.56 |  44.03 |  26.12 |
                |   4.19 |  15.55 |  45.91 |  11.27 |
----------------+--------+--------+--------+--------+
$2500           |  34215 |  18551 |  53816 | 750645 | 857227
                |   1.10 |   0.60 |   1.74 |  24.20 |  27.64
                |   3.99 |   2.16 |   6.28 |  87.57 |
                |   2.61 |   4.23 |  13.61 |  78.59 |
----------------+--------+--------+--------+--------+
TOTAL            1311836   439063   395490   955098   3101487
                   42.30    14.16    12.75    30.81    100.00
```

Table D-5

```
  COMPARISON OF GSL CERTIFICATION UNDER DIFFERENT MODEL
                    GRADUATE STUDENTS

             TABLE OF GCERT_FR BY GCERT_RR

GCERT_FR  FULL REPORTED   GCERT_RR  REDUCED REPORTED

FREQUENCY      |
 PERCENT       |
 ROW PCT       |
 COL PCT       |$500 OR |$501 - $|$2501 - |$5000    |  TOTAL
               |LESS    |2500    |$4999   |         |
---------------+--------+--------+--------+---------+
$500 OR LESS   | 150170 |      0 |   1001 |    1553 | 153220
               |  37.51 |   0.00 |   0.40 |    1.39 |  38.32
               |  97.01 |   0.00 |   1.01 |    1.01 |
               |  13.11 |   0.00 |   3.12 |    1.15 |
---------------+--------+--------+--------+---------+
$501 - $2500   |  16512 |  13097 |   5170 |       0 |  30003
               |   4.13 |   3.35 |   1.27 |    0.00 |   8.79
               |  17.11 |  34.31 |  14.50 |    0.00 |
               |   9.11 |  21.33 |   9.91 |    0.00 |
---------------+--------+--------+--------+---------+
$2501 - $4999  |   1120 |  27579 |  41077 |   25087 | [illegible]
               |   0.30 |   6.99 |  10.02 |    6.37 |  24.19
               |   1.42 |  24.68 |  43.37 |   26.50 |
               |   0.79 |  45.12 |  81.30 |   23.40 |
---------------+--------+--------+--------+---------+
$5000          |  12595 |  21137 |   2858 |   79868 | 115444
               |   3.15 |   5.28 |   0.71 |   19.97 |  28.87
               |  10.91 |  17.40 |   2.48 |   69.18 |
               |   8.97 |  33.05 |   5.58 |   74.71 |
---------------+--------+--------+--------+---------+
TOTAL            140602    61123    51200    106908   400402
                  15.17    15.20    12.81     26.74   100.00
```

Table D-6

```
   COMPARISON OF GSL CERTIFICATION UNDER DIFFERENT MODELS
                     GRADUATE STUDENTS

              TABLE OF GCERT_FB BY GCERT_RB

GCERT_FB  FULL BEST   GCERT_RB  REDUCED BEST

FREQUENCY       |
 PERCENT        |
 ROW PCT        |
 COL PCT        |$500 OR |$501 - $|$2501 - |$5000    |
                |LESS    |2500    |$4999   |         |  TOTAL
----------------+--------+--------+--------+---------+
$500 OR LESS    | 174716 |   1527 |      0 |       0 | 176243
                |  43.71 |   0.38 |   0.00 |    0.00 |  44.09
                |  99.13 |   0.87 |   0.00 |    0.00 |
                |  86.41 |   3.94 |   0.00 |    0.00 |
----------------+--------+--------+--------+---------+
$501 - $2500    |  13454 |   7188 |  19013 |       0 |  39655
                |   3.36 |   1.80 |   4.76 |    0.00 |   9.92
                |  33.93 |  18.13 |  47.95 |    0.00 |
                |   6.65 |  18.56 |  28.79 |    0.00 |
----------------+--------+--------+--------+---------+
$2501 - $4999   |   1429 |  30017 |  45590 |   36568 | 113604
                |   0.36 |   7.51 |  11.40 |    9.15 |  28.41
                |   1.26 |  26.42 |  40.13 |   32.19 |
                |   0.71 |  77.50 |  69.04 |   39.37 |
----------------+--------+--------+--------+---------+
$5000           |  12585 |      0 |   1429 |   56326 |  70340
                |   3.15 |   0.00 |   0.36 |   14.09 |  17.59
                |  17.89 |   0.00 |   2.03 |   80.08 |
                |   6.22 |   0.00 |   2.16 |   60.63 |
----------------+--------+--------+--------+---------+
TOTAL             202184    38732    66032     92894   399842
                   50.57     9.69    16.51     23.23   100.00
```

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END

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